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# IODINE

## WHY YOU NEED IT

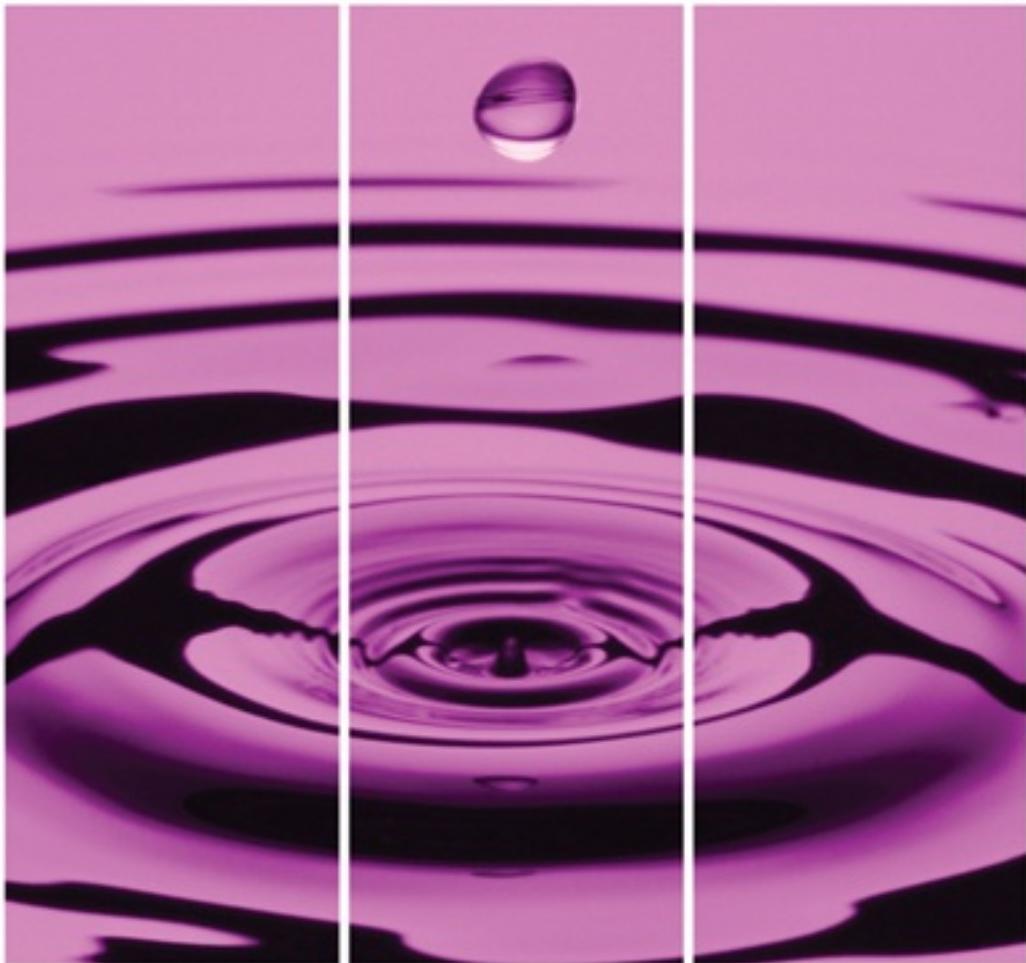
WHY YOU CAN'T LIVE WITHOUT IT

5th Edition



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Autoimmune Disease | Cancer | Detoxification | Fatigue | Thyroid Disease

David Brownstein, M.D.

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**IODINE**  
**WHY YOU NEED IT**  
**WHY YOU CAN'T LIVE WITHOUT IT**  
5th Edition

**David Brownstein, M.D.**

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**Iodine: Why You Need It, Why You Can't Live Without It 5<sup>th</sup> Edition**

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### ***Acknowledgements***

I gratefully acknowledge the help I have received from my friends and colleagues in putting this book together. This book could not have been published without help from the editors—my wife Allison, Dr. Guy Abraham, Stephanie Buist, Dr. Robert Radtke, Dawn Malott, and Janet Darnell. To Hailey Brownstein, thanks for the title pages!

I would also like to thank my patients. It is your search for safe and effective natural treatments that is the driving force behind holistic medicine. You have accompanied me down this path and I appreciate each and every one of you.

And, to my staff. Thank you so very much for taking this trip with me. Without your help and support, none of this would be possible. I do appreciate all of your hard work and your dedication.

### ***A Word of Caution to the Reader***

The information presented in this book is based on the training and professional experience of the author. The treatments recommended in this book should not be undertaken without first consulting a physician. Proper laboratory and clinical monitoring is essential to achieving the goals of finding safe and natural treatments. This book was written for informational and educational purposes only. It is not intended to be used as medical advice.

## **ABOUT THE AUTHOR**

David Brownstein, M.D. is a Board-Certified family physician who utilizes the best of conventional and alternative therapies. He is the Medical Director for the Center for Holistic Medicine in West Bloomfield, MI. He is a graduate of the University of Michigan and Wayne State University School of Medicine. Dr. Brownstein is a member of the American Academy of Family Physicians and the American College for the Advancement in Medicine. He is the father of two beautiful girls, Hailey and Jessica and is a retired soccer coach. Dr. Brownstein has lectured internationally about his success using natural items. Dr. Brownstein has authored eleven books: Iodine: Why You Need It, Why You Can't Live Without It, 5<sup>th</sup> Edition; Vitamin B12 for Health; Drugs That Don't Work and Natural Therapies That Do, 2<sup>nd</sup> Edition; The Miracle of Natural Hormones 3<sup>rd</sup> Edition; Overcoming Thyroid Disorders 3<sup>rd</sup> Edition; Overcoming Arthritis; Salt Your Way to Health, 2<sup>nd</sup> Edition; The Guide To Healthy Eating, 2<sup>nd</sup> Edition; The Guide to a Gluten-Free Diet, 2<sup>nd</sup> Edition; The Guide to a Dairy-Free Diet; and The Soy Deception.

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## ***DEDICATION***

*To the women of my life: Allison, Hailey, and Jessica, with all my love*

*To physicians not satisfied with the dogma who are willing to search for a new paradigm that promotes health.*

*To my staff: Thanks so much for all of your help and encouragement. I appreciate all of your hard work. And, to my patients. Thank you for being interested in what I am interested in.*

*Last, but certainly not least. I dedicate this book to my mentor on iodine: Dr. Guy Abraham.*

## PREFACE TO FIRST EDITION

Of all the elements known so far to be essential for human health, iodine is the most misunderstood and the most feared. Yet iodine is the safest of all the essential trace elements, being the only one that can be administered safely for long periods of time to large numbers of patients in daily amounts as high as 100,000 times the RDA. However, this safety record only applies to inorganic nonradioactive forms of iodine. Based on a review of the literature, both forms, iodine and iodide, are needed for optimal function of every organ and cell of the human body.<sup>1</sup>

Some organic iodine-containing drugs, such as amiodarone, are extremely toxic and prescribed by physicians. The severe side effects of these drugs are blamed on inorganic iodine although studies have clearly demonstrated that it is the whole molecule that is toxic, not the iodine released from it. A case in point: the thyroid hormones are organic iodine-containing substances. Not a single physician has attributed the effects of thyroid hormones to inorganic iodine. Why not? They are basically the same forms of iodine covalently bound to an organic molecule. This author believes that this inconsistency of doublethink is most likely due to decreased cognition caused by iodine deficiency. Medical iodophobia may have caused more human misery and death than both world wars combined by preventing meaningful clinical research in the daily amount of iodine needed for optimal physical and mental health<sup>2</sup>.

It is of interest that the recommended daily amount of iodine for supplementation by clinicians of previous generations, that is 12.5-37.5 mg in the form of Lugol's solution, turns out to be the exact range of intake for sufficiency of the whole human body, based on a recently developed loading test.<sup>3</sup> Iodine/iodide in the proper amounts resulted in increased urinary excretion of heavy metals such as lead and mercury; and had a detoxifying effect by increasing excretion of the toxic halides fluoride and bromide.<sup>4</sup> It is time to wake up and realize that we are sitting on the shoulders of the giants of past generations who have given us useful information, which we have discarded in favor of preconceived ideas by self-appointed experts.

This book by Dr. David Brownstein is a welcome departure from the past and a fresh look at facts only, discarding myths and unfounded concerns about inorganic nonradioactive iodine/iodide. Patients will be grateful to Dr. Brownstein for bringing to light a simple, safe, inexpensive way of healing many medical conditions.

The ultimate Healer is the Creator of heaven and earth. His guidance has been felt constantly during this project by this author. May He bless and guide Dr. Brownstein and his patients.

"I the LORD am your healer."

(Exodus 15:26)

Guy E. Abraham, M.D., FACN.

<sup>1</sup> Abraham, G.E., Flechas, J.D., Hakala, J.C., Orthoiodosupplementation: Iodine sufficiency of the whole human body. The Original Internist, 9:30-41, 2002.

<sup>2</sup> Abraham, G.E., The Wolff-Chaikoff Effect of Increasing Iodide Intake on the Thyroid. Townsend Letter, 245:100-101, 2003.

<sup>3</sup> Abraham, G.E. The safe and effective implementation of orthoiodosupplementation in medical practice. The Original Internist, April 2004 (In press).

<sup>4</sup> Abraham, G.E., Iodine Supplementation Markedly Increases Urinary Excretion of Fluoride and Bromide. Townsend Letter, 238:108-109, 2003

## Preface to the Fourth Edition

(Author's note: Dr. Abraham died before I began working on the 5<sup>th</sup> Edition of this book. He was gracious to write a new Preface for each edition. I am including the last Preface that he wrote for me.)

Less than five years ago, David Brownstein, M.D. introduced to the medical community and to consumers, his book on the essential element iodine, describing his experience with the orthoiodosupplementation program and the iodine/iodide loading test.

<sup>1</sup> This test is simple, straightforward, and practical.

Since then, he has crisscrossed the continental U.S.A. from East to West and North to South, lecturing on his experience with inorganic non-radioactive iodine to physicians, other healthcare professionals and consumers. Due mainly to his persistent efforts, reassuring healthcare professionals that inorganic non-radioactive iodine is safe and effective, there are now thousands of physicians and other healthcare professionals using the iodine/iodide loading test and implementing orthoiodosupplementation safely and successfully in their practices. After trying orthoiodosupplementation on themselves and their loved ones, they became confident that medical iodophobia was not justified for the inorganic, non-radioactive forms of this essential nutrient.

The number of publications presenting new research data on the orthoiodosupplementation program has increased markedly in this short time. As of December 2008, 23 manuscripts have been published. Dr. Brownstein is the sole author or coauthor in five of these publications. These publications are available on our website at [Optimox.com](http://Optimox.com), under Iodine Research.

Dr. Brownstein and I coauthored a publication, reporting the positive effect of vitamin C at 3000 mg/day on a defective cellular transport system for iodine, emphasizing the importance of a complete nutritional program for best results with orthoiodosupplementation.<sup>2</sup> In collaboration with Drs. Brownstein and Flechas, I recently published a procedure for assessing the saliva/serum ratio of inorganic iodide as an index of the efficiency of the iodine/iodide symporter system.<sup>3</sup> We have established normal values and have demonstrated a negative effect of elevated serum bromide on this ratio, suggesting that bromide interferes with cellular uptake of iodide. Iodine intake in daily amounts from 50 to 75mg iodine in the form of Lugol's tablet (Iodoral®) had a positive effect on the saliva/serum iodide ratio and decreased serum bromide.

Abnormalities in the cellular uptake of iodine were reported in breast cancer patients with elevated bromide levels.<sup>4</sup> Organification defects in the utilization of cellular iodide were reported in a subject with fibromyalgia.<sup>5</sup> Iodine alone at 100mg/day markedly improved the symptom scores. The addition of high dose vitamin B2 and B3 further improved the overall well-being in FM patients.<sup>6</sup>

The iodine project is now eight years old and strong, but not without enemies. Continued research and publications, education of physicians and consumers, and more widespread utilization of the orthoiodosupplementation program are the most effective ways to fight iodophobic bioterrorism and medical iodophobia.

The future of the essential element iodine in medical practice looks very promising. We are rediscovering what our medical predecessors already knew. To quote Nobel Laureate Albert Szent-Gyorgyi<sup>7</sup>: "When I was a medical student, iodine in the form of KI was the universal medicine. Nobody knew what it did, but it did something and did something good. We students used to sum up the situation in this little rhyme...If ye don't know where, what, and why; prescribe ye then K and I... Our medical predecessors, possessing very few and crude instruments only, had to make use of two given by nature (the use of which has since gone out of fashion): eyes and brains. They were keen observers and the universal application of iodide might have been not without foundation."

May the most-high God, Creator of heaven and earth, continue to guide us and bring to light what was kept in darkness for over 60 years--the safe and effective use of the essential element iodine in the medical practice.

Guy E. Abraham, M.D., FACN.

<sup>1</sup> Brownstein, D., Iodine: Why You Need It, Why You Can't Live Without It. Medical Alternatives Press, West Bloomfield, MI 2004

<sup>2</sup> Abraham, G and Brownstein, D. Evidence that the administration of Vitamin C improves a defective cellular transport mechanism for iodine: A case report. The original Internist. 12 (3): 125-130, 2005

<sup>3</sup> Abraham, G., Flechas, J., Evidence of defective cellular oxidation and organification of iodide in a female with fibromyalgia and chronic fatigue; The Original Internist. Vol 14: 2: 77-82. 2007

<sup>4</sup> Abraham, G., Flechas, J. Evidence of defective cellular oxidation and organification of iodide in a female with fibromyalgia and chronic fatigue. The Original Internist. Vol. 14:2:77-82. 2007

<sup>5</sup> Abraham, G., et al. IBID. The Original Internist. Vol. 142:77-82. 2007.

<sup>6</sup> Abraham, G., and J.D. Flechas, MD, The Effect of Daily Ingestion of 100 mg Iodine Combined with High Doses of Vitamins B2 and B3 (ATP Cofactors) in Five Subjects with Fibromyalgia The Original Internist, Vol. 15, No. 1, 8-15, March 2008

<sup>7</sup> Szent-Gyorgyi, Bioenergetics Academic Press, NY. 1957

## **FOREWORD to the 1<sup>st</sup> Edition**

Practicing holistic medicine for over 10 years has brought me into contact with many wonderful teachers. From these people I have learned a tremendous amount about how to use safe and natural remedies to promote true healing in the body while not relying on foreign substances (i.e., drugs) that simply treat the symptoms of illness and do little for treatment of the underlying cause of illness.

There are many physicians that I have learned from. Some of these wonderful physicians who have researched and educated others about their successes in using natural items to promote true healing include: Jonathan Wright, Majid Ali, Broda Barnes and William Jeffries. There are many more.

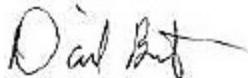
I would like to add one more name to that list. His name is Guy Abraham, M.D. Dr. Abraham has been researching the benefits of iodine therapy for 6 years. He studied the effects of iodine and looked at the research on iodine therapy. Dr. Abraham has written numerous articles about the misinformation on iodine and how this misinformation has contributed to the poor health of many of us.

While reading the ***Townsend Letter for Doctors and Patients*** (May, 2003), I read a letter to the editor that was titled, "Iodine Supplementation Markedly Increases Urinary Excretion of Fluoride and Bromide". I was intrigued. I knew of the deficiency of iodine and the consequences of this deficiency. I was also aware of certain toxic items (i.e., fluoride and bromide) in our diets that not only inhibited iodine utilization in the body but also accentuated iodine deficiency. After reading Dr. Abraham's letter, I phoned him.

I expressed my interest in iodine testing and treatment and Dr. Abraham began to educate me about how to test for iodine and how to properly use iodine. Since that time, I have tested hundreds of patients and found a significant percentage (>90%) exhibit laboratory and clinical signs of iodine deficiency. Treatment with the correct amount and correct form of iodine has greatly contributed to the good health of many of these patients.

Dr. Abraham and I have been collaborating for many months now. He is one physician (amongst many) who is not afraid to stand up and report what he thinks is true, even if it does not sit well with the establishment. But, Dr. Abraham uses good science to back up his claims. After pulling hundreds of research articles to educate myself, I realized that Dr. Abraham's view of iodine deficiency was 100% correct.

This book certainly would not have been written without the help and research of Dr. Abraham. I have learned a tremendous amount from Dr. Abraham and I can't thank him enough.



David Brownstein, M.D.  
April, 2004

## ***Foreword to 5<sup>th</sup> Edition***

It has now been ten years since I began working with my mentor on iodine—Dr. Guy Abraham. Dr. Abraham died in February, 2013. I will miss him terribly.

Dr. Abraham was one of the most brilliant physician/scientists that I have known. He was an interesting man who started his career as a researcher developing testing methods for measuring hormone levels. Dr. Abraham's early research, dating back to the 1950's, is still used today in testing steroid hormones.

His interest in iodine came about in his quest to search for safe and natural therapies that would help people achieve their optimal health. When Dr. Abraham began researching iodine, he was amazed that there was no accurate testing to measure the body's iodine status. Over the course of a few years, Dr. Abraham developed the 24-hour iodine loading test.

Dr. Abraham reported on his discovery in the **Townsend Letter for Doctor's and Patients** (May, 2003). I read a letter to the editor that was titled, "Iodine Supplementation Markedly Increases Urinary Excretion of Fluoride and Bromide." I was intrigued. At that time, I knew of the deficiency of iodine and the consequences of this deficiency. At this time, I was frustrated because the iodine I was using (iodide versions) was not helping my patients. It was not harming anyone, but no one was getting better by using it.

After reading Dr. Abraham's letter, I phoned him. I expressed my interest in learning about his new test. After an extended time period (Dr. Abraham takes some time before he "warms" up to someone) we started developing a relationship. Over the next ten years, Dr. Abraham taught me more than he will know about iodine, how to test for it and how to treat deficiencies of it.

I would fly to California a few times per year to work/study in Dr. Abraham's lab. Those trips were the most intellectually stimulating times I have had during my adult life. Dr. Abraham taught me to critically evaluate medical research. During our visits, we would always have biochemistry books out and we spent many hours discussing the biochemical pathways of the body. I will miss him and those times terribly.

But, I will continue to carry on his work. We all learn from our predecessors. I learned from one of the greatest. Dr. Abraham, you will be missed, but your work has advanced medicine and, more importantly, has helped untold numbers of patients.

The iodine story is not complete. Our continuing exposure to increased amounts of toxic halogens—bromide, fluoride, and chlorine derivatives—necessitates that we all ensure that our iodine levels are optimal. We are suffering from a plethora of illnesses all related to iodine deficiency including: cancer of the breast, thyroid, ovary, uterus, and prostate, as well as autoimmune thyroid illnesses, hypothyroidism, fibrocystic breast disease, ADHD, chronic fatigue, and fibromyalgia. All of these conditions can be related to iodine deficiency.

This book was written to educate you about iodine. Ensuring that you and your family ingest adequate amounts of iodine can make the difference between living a healthy life or a life troubled with medical issues. Iodine is truly an amazing essential nutrient. I am honored to write about it.

TO ALL OF OUR HEALTH!!



David Brownstein, M.D.  
January, 2004

## Chapter 1

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### *Introduction to Iodine*

## **CHAPTER 1: INTRODUCTION TO IODINE**

Steven, a 55-year-old photographer, complained of losing his creative abilities. “I can’t see the pictures like I used to. In fact, I have no motivation to even work. I feel like I am in a fog,” he claimed. Steven was diagnosed with depression three years earlier and treated with antidepressant medications. Although he felt some improvement from the antidepressant medications, he found that he was having difficulty being productive at work. “My business was going down the tubes. Clients were leaving me left and right,” he claimed. When I saw Steven, he had many of the signs of hypothyroidism including poor eyebrow growth, slow reflexes, puffiness under his eyes, and very dry skin. Steven’s blood tests showed low-normal thyroid function tests and a very low basal body temperature (96.6 degrees Fahrenheit—normal 97.8-98.2 degrees Fahrenheit). Steven’s iodine-loading test showed a low iodine level at 23% excretion (normal: >90% excretion. The iodine-loading test will be explained in [Chapter 2](#)). He was initially treated with 50mg/day of iodine/iodide (Iodoral®). His blood and hair tests revealed nutritional deficiencies that were contributing to his problems. He was prescribed a combination of vitamins, minerals, and unrefined salt (Celtic Sea Salt®), in addition to the iodine. At a two-month follow-up visit, he reported, “I am so much better. It is like night and day. My creative level is tremendously improved. I can now see things at work. You either have the eye for photography or you don’t. Now I have it again. I feel like I am 20 years old. At work, my phone won’t stop ringing. The only bad thing is that I am getting too busy.”

Update (2<sup>nd</sup> Edition) on Steven’s case: Steven has been taking 50mg/day of iodine for two years. His recent iodine loading test has improved to 85% excretion (normal >90% excretion).

New 5<sup>th</sup> Edition Update: Steven’s iodine loading test now is normal (>95% excretion). He recently reported, “I feel great. The iodine has truly changed my life and changed it for the better. I am grateful to feel this good.”

Steven’s story is not unique. The human body is a wonderful thing. If you give it the proper nutrients, it can perform optimally. Conversely, when the raw materials (vitamins, minerals, hormones, enzymes, amino acids, etc.) are lacking or imbalanced, it sets the stage for poor health and the onset of disease. At the present time, iodine deficiency is occurring in epidemic proportions. This book will explore the causes and treatment of iodine deficiency.

### **WHAT DOES IODINE DO?**

For over 100 years, iodine has been known as the element that is necessary for thyroid hormone production. However, it is rare to see any further mention of iodine’s other effects in the body. Iodine is found in each of the trillions of cells in the body. Without adequate iodine levels, life itself is not possible.

Iodine is not only necessary for the production of thyroid hormone, it is also responsible for the production of all of the other hormones in the body. Adequate iodine levels are necessary for proper immune system function. Iodine contains potent antibacterial, antiparasitic, antiviral, and anticancer properties. Iodine is also effective for treating fibrocystic breasts and ovarian cysts. [Table 1 \(page 26\)](#) lists some of the many benefits of iodine and some of the conditions that would benefit from adequate iodine supplementation. This book will review the many therapeutic aspects of iodine.

Approximately 1.5 billion people, about one-third of the earth’s population, live in an area of iodine deficiency as defined by the World Health Organization. Iodine deficiency disorder can result in mental retardation, goiter, increased child and infant mortality, infertility, and socioeconomic decline.<sup>1</sup> Iodine deficiency disorder is the most common preventable form of mental retardation known.

**Table 1: Therapeutic Actions of Iodine and Conditions Iodine Can Treat**

<b>Therapeutic Actions</b>	<b>Conditions Treated With Iodine</b>
Antibacterial	ADD/ADHD
Anticancer	Atherosclerosis
Antiparasitic	Breast Diseases
Antiviral	Dupuytren's Contracture
Elevates pH	Excess Mucous Production
Mucolytic Agent	Fatigue
	Fibrocystic Breasts
	Goiter
	Hemorrhoids
	Headaches and Migraine Headaches
	Hypertension
	Infections
	Keloids
	Liver Diseases
	Nephrotic Syndrome
	Ovarian Disease
	Parotid Duct Stones
	Peyronie's
	Prostate Disorders
	Sebaceous Cysts
	Thyroid Disorders
	Vaginal Infections

Iodine is a relatively rare element, ranking 62<sup>nd</sup> in abundance of the elements of the earth. Iodine is primarily found in seawater in very small quantities and solid rocks (usually near the ocean) that form when seawater evaporates. Iodine can also be found in sea organisms, such as seaweed. In fact, seaweed is one of the most abundant sources of iodine because seaweed has the ability to concentrate a large amount of iodine from the ocean water.

Iodine is not very abundant in the earth's crust. It is estimated to be about 0.3-0.5 parts per million. In fact, it is in the bottom third of the elements in terms of abundance.<sup>2</sup>

If the soil has adequate iodine levels, the crops grown on that soil will contain adequate iodine levels. Conversely, deficient iodine levels will be found in crops grown on iodine-deficient soil.

There are naturally occurring non-radioactive and radioactive forms of iodine. Radioactive iodine can be used in medicine to diagnose and treat certain illnesses, particularly illnesses of the thyroid gland.

Commercially available non-radioactive iodine primarily comes from several sources: Chilean saltpeter, seaweed, and brine water in oil wells. The action of the waves from the ocean can make iodine gas. Once airborne, iodine can combine with water or air and enter the soil. Non-radioactive iodine can enter our food system in a variety of ways. First, plants can take up iodine from the soil. Second, airborne iodine can land on fresh water supplies and, finally, airborne iodine can land on the ground, combine with salt, and become iodized salt.

Radioactive iodine can enter the air from reactions in nuclear power plants or explosions of nuclear materials. Radioactive iodine has been associated with certain types of cancer including thyroid cancer and certain blood cancers. Children are more susceptible to radioactive iodine since they have smaller thyroid glands, and they will receive a proportionately larger radioactive dose than an adult when they are exposed to radioactive iodine. Radioactive iodine damage can be prevented by the ingestion of non-radioactive inorganic iodine.

The meltdown of the Fukushima nuclear reactor in Japan should give us all pause. It is best to ensure iodine sufficiency—for both health and safety issues. If we are ever confronted with a Fukushima-like event, iodine sufficiency would be a protective factor minimizing problems with radioactive iodine exposure.

### WHERE IS IODINE FOUND IN THE BODY?

Every cell in the body contains and utilizes iodine. Iodine is concentrated in the glandular system of the body. The thyroid gland contains a higher concentration of iodine than any other organ of the body. Large amounts of iodine are also stored in many other areas of the body including the salivary glands, cerebrospinal fluid and the brain<sup>3</sup>, gastric mucosa, choroid plexus, breasts, ovaries, and the ciliary body of the eye. In the brain, iodine concentrates in the substantia nigra, an area of the brain that has been

associated with Parkinson's disease.

Iodine is essential for the normal growth and development of children. Severe iodine deficiency can result in severe mental deficiency and deafness (i.e., goiter). In addition, spontaneous abortion, as well as delayed physical and intellectual development is associated with iodine deficiency. Attention deficit/hyperactivity disorder (ADHD) is also related to iodine deficiency (see [Chapter 10](#)).

Conversely, too much iodine can be a problem. In rare cases, excess iodine (i.e., doses greater than 1gram/day) has been associated with hyperthyroid symptoms.

## HISTORY OF IODINE

Bernard Courtois first discovered iodine in 1811 during the course of making gunpowder.<sup>4</sup> He was making compounds of potassium and sodium from seaweed. When he accidentally added too much sulphuric acid to the mixture, he observed purple vapors arising from it. Due to its purple color, the new element was named iodine (iodes in Greek means violet).<sup>5</sup>

The first medical use of iodine was reported by Jean Francois Coindet (1774-1834), who showed that goiter (i.e., swelling of the thyroid) could be treated with iodine. The use of iodine in treating goiter was the first time that a single item (iodine) was used to treat a specific illness (goiter). Some cite this discovery as the birth of western medicine.

Jean-Baptiste Boussingault (1802-1887) verified the work of Coindet in 1824. Boussingault observed that goiter did not occur at many silver mining sites. His experiments showed conclusively that iodine in the water at these mining sites prevented goiter in people who drank the water. His recommendation at the time was that goiter could be prevented by having people eat the iodine-containing salt from these mines. Unfortunately, it took the United States nearly 100 years to implement the findings of Boussingault. During this time period, untold numbers of Americans suffered from the ravages of iodine deficiency and goiter.

## MICHIGAN/OHIO STUDIES

In the early 1900's there was a high prevalence of goiter in the states bordering the Great Lakes. Due to the earlier work of Boussingault and Coindet, it was hypothesized that adding iodine to the diet of people in the Great Lakes area would decrease the incidence of goiter. In 1923-1924, the State of Michigan's Department of Health conducted a large-scale survey of goiter in four counties. Of 66,000 school children examined, nearly 40% had enlargement of the thyroid gland (i.e., goiter).<sup>6 7 8</sup> In 1924, iodized salt was introduced to the area. By 1928, there was a 75% reduction of goiter observed and by 1951, less than 0.5% of school-age children had a goiter. Research also showed a greater reduction in goiter among regular users of iodized salt as compared to non-users.

David Marine conducted the first large-scale study on using iodine as a therapy to reduce goiter. In the early 1900's, he looked at the positive effects of iodine supplementation for decreasing goiter in farm animals. From the results in animals, Marine estimated the amount of iodine necessary to treat humans.

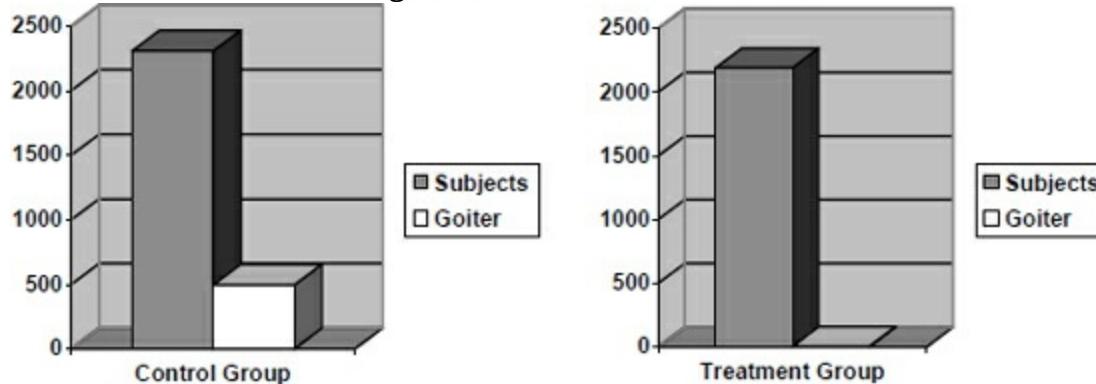
Dr. Marine chose Akron, Ohio as the test area for iodine supplementation. Akron, Ohio was chosen due to the high rate of goiter—56% of school-aged girls had goiter in Akron.<sup>9</sup> There was a 600% increase in goiter in adolescent girls versus boys.<sup>10</sup> The reason for this increase was due to the increased iodine requirements in pubertal girls as compared to boys. The first glandular tissue to grow at puberty is the breasts, which require significant amounts of iodine. Dr. Marine studied two groups of students:

1. A control group of 2305 students where no iodine was given.

2. A treatment group of 2190 students who were given 9mg/day of sodium iodide (averaged daily) for 2.5 years. This dose of iodine is nearly 100x the present RDA for iodine.

The results are shown in [Figure 1](#). The control group (no iodine) showed a 22% incidence of goiter. The treatment group had a significantly lowered 0.2% incidence of goiter.

**Figure 1: Dr Marine's Iodine Test**



Due to the positive results from using iodized salt in Michigan and Ohio, the rest of the United States quickly adopted the

policy of adding iodine to salt, thus decreasing the goiter rate throughout the country. Today, the World Health Organization actively promotes the use of iodized salt to help prevent goiter throughout the world.

### HOW DO YOU INGEST IODINE?

Iodine, unlike vitamins and minerals, is not present in adequate amounts in most foods. Specific plants absorb iodine when it is present in the soil. Iodine is found in many ocean foods, such as fish (cod, sea bass, haddock, and perch) and sea vegetables (seaweed). Iodine can also be found in many other food products either by adding iodine to animal feed or by adding iodine to the food source.

Iodine has also been added to salt products (i.e., iodized salt). The U.S. government determined that the most cost-effective way to prevent goiter of the thyroid gland was to add iodine to the salt supply. Ingesting iodine through the use of iodized salt costs pennies per day. Although the addition of iodine to the salt supply has lessened the prevalence of goiter, it is inadequate to supply the body's need for iodine. This will be more fully explained in [Chapter 2](#).

### HOW MUCH IODINE IS IN SALT?

Iodine is added to table salt at 100ppm as potassium iodide, which amounts to 77ug iodine/gram of salt. Estimates are that less than 50% of the U.S. population uses iodized table salt.<sup>11</sup> However, that estimate is probably high due to the prevalence of low-salt diets and low-salt food products. I believe the number of Americans using iodized salt is well-below 50%, probably around the 30% level. [Chapter 2](#) will explore this topic in more detail.

The amount of iodine in food varies. Seafood, multiple vitamins, and many farm products may contain iodine. Dairy products, eggs, and meat may contain iodine if iodine is properly added to the feed of animals. [Table 2](#) lists the iodine content of many different food sources. However, iodine was removed from many food products in the 1980's and these estimates may not be valid today.

**Table 2: Iodine Content in Selected Food Items in the United States**

Food	μg/iodine/serving
Ready-to-eat cereals	87
Dairy-based desserts	70
Fish	57
Milk	56
Overall dairy products	49
Eggs	27
Bread	27
Beans, peas, tubers	17
Meat	16
Poultry	15

1990 Iron, zinc, copper, manganese, selenium and iodine in foods from the United States total diet study. J. Food Compos. Anal. 3:166

### WHY THE SOIL IS DEFICIENT IN IODINE

The soil around the oceans generally contains adequate amounts of iodine. The more inland and mountainous areas generally have lesser amounts of iodine. The Midwestern United States, including my home state of Michigan, is part of the "Goiter Belt" since our soils are so deficient in iodine. The Goiter Belt is not close to any natural iodine-containing source such as the ocean. Any natural or man-made phenomenon that leads to soil erosion will make an iodine-deficient soil problem worse. The movement of the glaciers across the Midwest is cited as one of the reasons why the soil is iodine deficient. In addition, deforestation and poor farming techniques exacerbate this problem.

This book will explore, in detail, the medical conditions that can arise as a result of iodine deficiency and how these disorders can be improved by supplementing with the correct amount and form of iodine. The next two case histories give examples of some of the conditions that can be treated with iodine supplementation.

*Kevin, a 31-year-old sales representative, was well until he had a flu shot one year ago. "Before receiving that*

vaccination, I was an extremely active weight lifter for 12 years. After the flu shot, I became disabled. I could not work and I could barely get out of bed in the morning," he said. Kevin was diagnosed with hypothyroidism shortly after the flu shot and put on Synthroid. When I saw Kevin, he had many of the signs of hypothyroidism, including puffiness, dry skin, thickened tongue, and slow reflexes. I changed Kevin's medication to Armour thyroid® and he noticed an immediate improvement, but he still did not feel like his normal self. Laboratory tests showed that Kevin was extremely iodine deficient (24-hour loading test showed 55% iodine excretion—normal >90% excretion). After supplementing with an iodine/iodide supplement, he noticed an immediate improvement. He was feeling so much better that he wrote me a letter which said:

"In the first five weeks of taking the iodine, I lost five pounds. The weights that I have been able to use on practically all of my exercises have increased between 15-25%. My recuperation time between workouts seems to be steadily improving. It seems as though I have been waking up on time much more consistently than ever before. I am awake and energized at about 6:00 a.m., which has never been the case before in my life! Additionally, I feel as though my energy level is much more stable throughout the day. Since I have been taking the iodine, my need for caffeine in the morning has disappeared. Overall Dr. Brownstein, I feel much better than I did before starting the iodine therapy."

Paula, age 42, suffered with severe headaches for over ten years. "I almost learned to live with the headaches. They just became a daily part of my life," she said. Paula was being treated for hypothyroidism with Armour® thyroid and noticed the thyroid hormone improved her headaches by approximately 40%. Paula said, "I was happy to get some relief, but I wasn't satisfied. It is no fun to wake up most days with a vice around your head." When Paula was checked for iodine levels, her serum iodine levels were zero (below the detectable limits of the test). The low iodine levels were confirmed with an iodine-loading test which was extremely low at 17% (normal >90%). Paula was placed on 37.5mg of a combination of iodine and iodide (Iodoral®) and noticed an improvement in her headaches within two weeks. "I couldn't believe it. I started to actually have headache-free days. After four weeks on the iodine, my headaches were over 95% better. Even if I did get a headache, it was not nearly as severe. As I started to feel better, I began to realize how much the headaches were impacting my life," she claimed. Paula ran out of the iodine two months later and all of her symptoms began returning. Paula reported, "It took about two weeks off of the iodine before the headaches started to return. All of the same symptoms I was suffering with began to come back. Again, after I started the iodine, the headaches began to go away. I feel like the iodine has given me a new lease on life. My husband and my children thank you."

## FINAL THOUGHTS

Iodine deficiency is, unfortunately still with us, and is occurring at epidemic levels. Iodine deficiency is associated with a plethora of illnesses (see [Table 1](#)). The next chapters will show you how to properly measure iodine levels and will educate you on the mechanisms of action that iodine has in our bodies. Furthermore, you will learn that iodized salt is not only an inadequate source for providing sufficient amounts of iodine to the body, it is a toxic, devitalized substance that is best avoided.

<sup>1</sup> Manner, M.G., et al. Salt Iodization for the Elimination of Iodine Deficiency. International Council for the Control of Iodine Deficiency Disorders. 1995

<sup>2</sup> Modern Nutrition in Health and Disease, 9<sup>th</sup> Edition. Williams and Wilkins, 1999.

<sup>3</sup> Adrasi, E. Iodine concentration in different human brain parts. Analytical and Bioanalytical chemistry. November 13, 2003

<sup>4</sup> Modern Nutrition in Health and Disease, 9<sup>th</sup> Edition. Williams and Wilkins, 1999.

<sup>5</sup> Newton, David. Chemical Elements. Lawrence W. Baker, Editor. 1999

<sup>6</sup> Kimball, O.P. Prevention of goiter in Michigan and Ohio. JAMA. 1937; 108:860-864

<sup>7</sup> Matovinovic, J., et al. Goiter and other thyroid disease in Tecumseh, Michigan. JAMA. 1965; 192(#): 134-140

<sup>8</sup> Kimball, O.P. Endemic Goiter: A food deficiency disease. J. Am. Dietetic. Assn. 1949; 25:112

<sup>9</sup> Marine, D. Prevention and treatment of simple goiter. Atl. Med. J. 26:437-442, 1923

<sup>10</sup> Marine, D. The prevention of simple goiter in man. J. Lab. Clin. Med. 3:40-48

<sup>11</sup> Dunn, John. Editorial: What's happening to our iodine? J. of Clinical Endocrin. And Metab. Vol. 83, No. 10. 1998

## Chapter 2

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### Iodine Deficiency and Iodized Salt

## **CHAPTER 2: IODINE DEFICIENCY AND IODIZED SALT**

David, a 42-year-old Michigander, had taken good care of himself. He regularly took vitamins and minerals, did not eat a lot of junk food and exercised regularly. “I feel better now than I did when I was in my 20’s. I eat better and my energy level is better,” he said. His father, mother, and two sisters were being treated for hypothyroidism. David was diagnosed with hypothyroidism eight years ago and was taking thyroid medication (Armour® thyroid) regularly. When David’s iodine level was checked with an iodine/iodide loading test, he was shocked. His iodine level was found to be very low at 46.2% excretion (normal excretion is greater than 90%). “I couldn’t believe it. How could my iodine level be so low, when I felt so good? I have been taking vitamins and minerals for years,” he said. When he started supplementing with an iodine/iodide combination (Iodoral®), he immediately felt better. “My energy level dramatically increased. I thought I was feeling good before I began taking the iodine, but now I know what really feeling good is about. I started sleeping better and my dreams became much more vivid. In addition, my head felt much clearer. It feels wonderful,” he exclaimed. After three months of iodine supplementation, David’s iodine levels improved to a more healthy 87% excretion (normal levels >90%).

David is your author. After experiencing the wonderful effects of taking iodine, and hearing of the positive results my patients have experienced with using iodine, I became very interested in researching its clinical uses.

*New 5<sup>th</sup> Edition update on David’s case: I am still taking iodine—now at 75mg/day. I still feel well on it. If I miss a few days of taking it, I feel my energy level decline. My bromide level, which was high at 126mg/L has now fallen to 10mg/L. There is no known therapeutic effect of bromide. I believe our continual exposure to toxic halides has allowed my bromide levels to still remain elevated. Bromide is a toxic halide that is detoxified from the body by iodine. More about bromide can be found in [Chapter 11](#).*

### **INTRODUCTION**

Iodine deficiency is a worldwide problem. Diets that are deficient in iodine can result in many severe medical conditions including cretinism (very severe brain damage occurring very early in life), mental impairment, reduced intellectual ability, goiter, and infertility. In addition, iodine deficiency predisposes one to an increased risk of breast, prostate, endometrial, and ovarian cancer.<sup>1</sup> There is a decreased childhood survival rate associated with iodine deficiency. Studies have shown that neonatal mortality can be decreased by up to 50% when iodine deficiency is rectified.<sup>2</sup> Other illnesses that may result from iodine deficiency include sudden infant death syndrome (SIDS), multiple sclerosis, and other myelin disorders,<sup>3</sup> as well as ADHD.

The World Health Organization has recognized that iodine deficiency is the world’s greatest single cause of preventable mental retardation.<sup>4</sup> Iodine deficiency has been identified as a significant public health problem in 129 countries. Approximately one-third of the world’s population lives in iodine deficient areas and up to 72% of the world’s population is affected by an iodine deficiency disorder.<sup>5</sup>

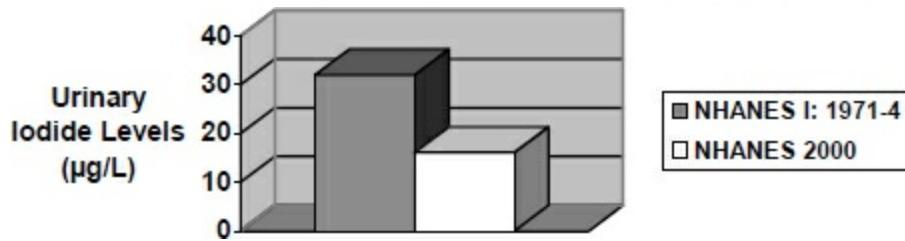
### **IODIZED SALT**

Some may think that the iodization of salt (i.e., iodized salt) has eliminated iodine deficiency disorders in the United States. However, the data does not support that conclusion. Over the last 40 years, studies by the National Health and Nutrition Examination Survey I (NHANES—completed 1971-1974) and NHANES 2000 show iodine levels have dropped 50% in the United States (see [Figure 2](#) next page).<sup>6</sup> This drop was seen in all demographic categories: ethnicity, region, economic status, population density, and race. The percentage of pregnant women with low iodine concentrations increased 690% over this time period. As previously mentioned, low iodine concentrations in pregnant women have been shown to increase the risk for cretinism, mental retardation, attention deficit disorder, and other health issues in children. These topics will be explored in more detail in [Chapter 10](#).

### **HOW MUCH IODINE IS IN IODIZED SALT?**

In the United States, iodine is added to salt to provide a content of 77µg of iodine per gm of salt.<sup>7</sup> Although the content of iodine in salt varies from country to country (depending on the standard set by the governing agencies), the goal is to achieve the RDA for iodine. In the United States, the RDA of iodine is from 150µg/day to 290µg/day (see [Table 3](#)). The average salt intake in the U.S.A. is estimated to be approximately 5gm/day, which would theoretically supply 385µg of iodine. However, studies have shown that urine levels of iodine in 24-hour urine tests are approximately five times lower.<sup>8</sup>

**Figure 2:  
NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY IODIDE LEVELS**



**Table 3: RDA for Iodine<sup>9</sup>**  
**The recommended daily allowance of iodine**

Life Stage	RDA
Adult Male	150µg/d
Adult Female	150µg/d
Pregnancy	220µg/d
Lactation	290µg/d

Remember, the RDA for iodine was set up to prevent goiter, which it does very well. However, as illustrated in this chapter and throughout this book, the RDA for iodine is inadequate to provide enough iodine to promote optimal thyroid, endocrine, and immune system functioning. Furthermore, the RDA is inadequate to prevent cancer.

#### IS IODIZED SALT A GOOD SOURCE OF IODINE?

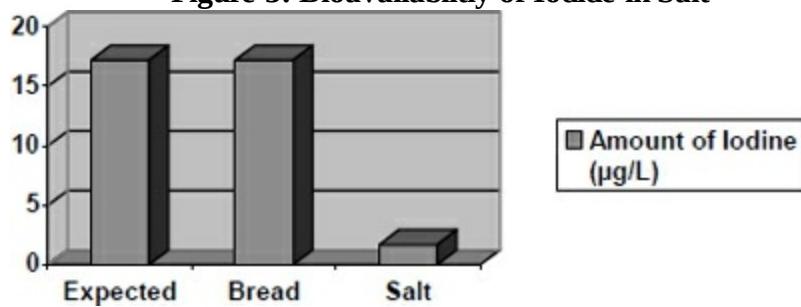
As mentioned above, iodine levels have fallen by approximately 50% over the last 40 years according to the NHANES data.<sup>10</sup> Iodine was added to salt in the 1920's to help combat thyroid goiter. Since that time, iodine is still being added to many brands of salt.

I was taught in medical school that there is enough iodine in salt to supply the body's need for iodine. In fact, I believe that this has been taught in every medical school for over 80 years. However, there were no studies to back up this claim and the NHANES data clearly shows that there is something happening to cause iodine levels to decrease by over 50% during the last 40 years.

Is iodized salt the best source of iodine for the body? The research does not support the idea that iodized salt is a readily available source of iodine for the body.

In 1969, researchers looked at the bioavailability of iodine in salt versus bread.<sup>11</sup> Two groups of people were studied; one group ingested a measured amount of iodine in salt, the other group ingested a measured amount of iodine in bread. Both subject groups were estimated to ingest approximately 750µg of iodine. By ingesting 750µg of iodine, the expected serum levels of iodine would be 17.2µg/L. However, as shown in Figure 3, the iodized salt group only had a serum level of 1.7µg/L versus 18.7µg/L for the bread group. This information would suggest the iodine in iodized salt is only 10% bioavailable.<sup>12</sup>

**Figure 3: Bioavailability of Iodide in Salt**



Iodine is added primarily to refined salt. Refined salt is a lifeless, devitalized product that has had all of its minerals removed

and has also been exposed to toxic chemicals that gives it its white color. The ingestion of refined salt leads to many health problems and it needs to be avoided. Unrefined salt should be the salt-of-choice. For more information on the health benefits of unrefined salt, I refer the reader to [\*\*\*Salt Your Way to Health.\*\*\*](#)

### **WHY ARE PEOPLE DEFICIENT IN IODINE?**

It has been assumed that since the iodization of salt was implemented, iodine deficiency disorders would be a thing of the past. Due to the poor availability of iodine in salt as well as a declining salt intake by the population, this is not the case. There are additional reasons why iodine deficiency disorders are still present today.

Over the years, poor farming techniques have led to deficiencies of iodine and other minerals in the soil. Crops grown in iodine-deficient soil will be deficient in iodine. Also, the stigma of salt causing high blood pressure has convinced many individuals not to use salt in their foods. Many times the only iodine one will get from the diet is found in iodized salt. A low-salt diet can naturally lead to an iodine-deficient state.

Radioactive iodine, used in many medical procedures, will further exacerbate an iodine deficiency problem. Also, exposure to many chemicals that inhibit iodine binding in the body (e.g., bromide, fluoride, chloride—explained in [Chapter 11](#)) further worsens the problem.

Certain diets and lifestyles can also predispose one to developing iodine deficiency. Some examples of these diets are listed in [Figure 4](#) on the next page. Inadequate dietary iodine intake can cause many severe problems including thyroid problems, cancer, intellectual decline, cretinism, and others.

The most significant change in the iodine status of recent times occurred with the changing of the food industry. In the 1960's, iodine was added to the commercial baking industry as a dough conditioner to aid bread and pastry manufacturers.

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#### **Figure 4: Diets That May Cause Iodine Deficiency**

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1. Diets without ocean fish or sea vegetables
  2. Inadequate use of iodized salt including low-sodium diets
  3. Diets high in the consumption of bakery products (e.g., breads, pasta) which contain bromide
  4. Vegan and vegetarian diets
- 

This single addition to baked goods significantly increased the iodine intake of the U.S. population, as one slice of bread contained the RDA for iodine of 150 $\mu$ g.<sup>13</sup> Articles from the NIH were published which questioned the safety of using iodine in bakery products. Some researchers felt that this level of iodine in baked goods would cause a malfunctioning of the thyroid gland.

Ten years later, bromine replaced iodine in the baking industry. Bromine is a halide (as are iodide, fluoride, and chloride). All halides compete with one another for absorption and receptor binding in the body. Bromine interferes with iodine utilization in the thyroid as well as wherever else iodine would concentrate in the body.<sup>14</sup>

Due to the interference of iodine binding in the body, bromine is a known “goitrogen”—it promotes the formation of goiter in the body. Bromine is a toxic substance that has no therapeutic use in our bodies. Bromine also can bind to iodine receptors in the breast and is a known carcinogen to the breast. On the other hand, iodine has anticarcinogenic properties.

We now have two major reasons why iodine deficiency disorders have become much more common.

1. The substitution of bromine for iodine in the bakery process lowered the iodine utilization.
2. Bromine began effectively binding to and inhibiting iodine from binding to its own receptors.

The consequence of replacing iodine with bromine has been to make a bad situation worse. Iodine deficiency has been accelerated and, due to increasing bromide levels, iodine is now being competitively inhibited from binding to its own receptors. The medical consequences include increased thyroid disorders including autoimmune thyroid disorders (Hashimoto's and Graves' disease), and thyroid cancer. Furthermore, the rise of other cancers including breast, ovarian, uterine, and prostate may be related to this phenomenon. This will be explained further in [Chapter 11](#).

### **PERCHLORATE**

Perchlorate is a substance that is found in nature and is also a man-made substance. Perchlorate is manufactured for rocket fuel and many industrial uses. Perchlorate contains one atom of chlorine and four atoms of oxygen. Chlorine is part of the halide family (iodine, bromine and chlorine). Excess perchlorate levels can displace iodine in the body and damage the transport of iodine into the cell. Perchlorate contamination of our water supply is widespread and increasing. Increasing perchlorate exposure is another reason why iodine levels have fallen over the last 30 years. [Chapter 11](#) reviews the details and consequences of perchlorate exposure in much more detail.

## HOW DO YOU MEASURE IODINE LEVELS?

The generally accepted method of testing iodine is by measuring the amount of iodine in the urine. However, that is not a reliable method in order to determine the whole-body iodine status.

Over 10 years ago, Dr. Abraham and co-investigators developed an iodine-loading test. It is based on the concept that whole-body iodine status can be established by measuring the amount of iodine excreted over 24 hours after taking a 50mg iodine tablet. Since over 95% of orally ingested iodine in an iodine-sufficient individual is excreted in the urine, following urinary excretion levels of iodine can provide useful information about the body's utilization of iodine. The iodine loading test is based on a simple premise; the body will hold onto more iodine in a deficient state as compared to a sufficient state. In other words, if the body is deficient in iodine, you would expect more iodine to be retained by the body. Conversely, if the body has sufficient iodine levels, you would expect the body to retain less iodine. This is exactly what happens with the 24-hour iodine loading test. It is a functional test of whole-body iodine levels.<sup>15</sup> In my experience, the iodine-loading test has been found to provide useful information on the body's iodine status.

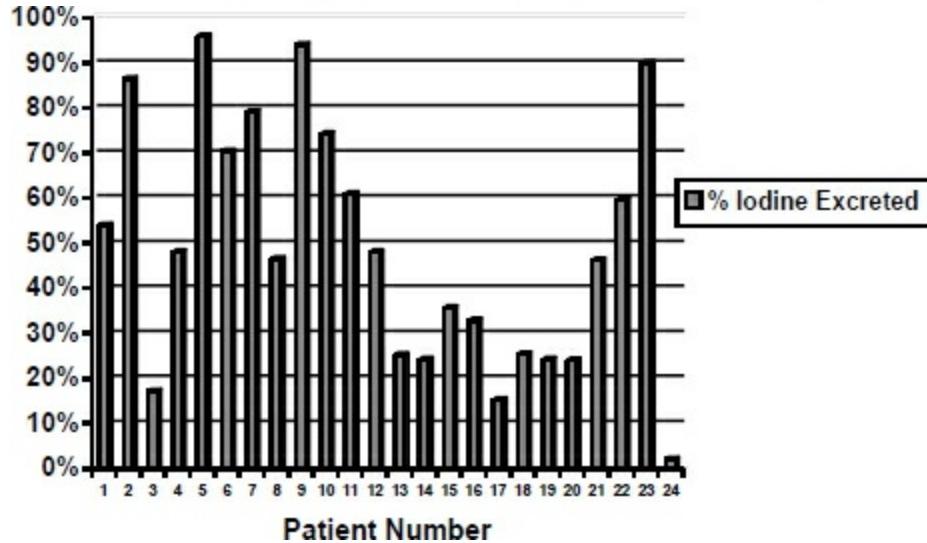
Iodine binds to iodine receptors throughout the body. If the body's receptors for iodine are sufficient in iodine, a large percentage of ingested iodine will be excreted from the body. On the other hand, if there is an iodine deficiency present, ingested iodine will be retained at a much larger percentage.

The iodine-loading test is performed after taking 50mg of an iodine/iodide combination. Urine is collected for 24 hours after taking the iodine. In an iodine-sufficient state, approximately 90% of a mixture of a 50mg dose of iodine/iodide would be excreted (i.e., 45mg), and 10% of the iodine would be retained (i.e., 5mg). Levels below 90% excretion would indicate an iodine-deficient state.

## FIRST LOOK AT IODINE LEVELS AT MY OFFICE

Twenty-four patients in my office were selected at random to have their iodine status evaluated. Each patient was instructed to take 50mg of a combination of iodine/iodide (Iodoral®) and collect 24 hours of urine. The urine was evaluated for the amount of iodine excreted. The results (Figure 5) show that 91.7% of the patients tested low for iodine levels. Iodine sufficiency occurs when the urinary excretion is above 90%.

FIGURE 5: IODINE LEVELS IN 24 PATIENTS



It is worthwhile noting that most of these patients were already on a holistic treatment plan which included vitamins, minerals and herbs. However, they were not supplementing with iodine. Most of the patients studied had thyroid abnormalities, including hypothyroidism, Hashimoto's, or Graves' disease. There was no difference in the iodine levels between the various thyroid disorders; nearly all (22/24) were low. The results of this small study were the first clear indicators I had that iodine deficiency was occurring in a large percentage of the population.

## UPDATED RESULTS AT MY OFFICE

To the present date, we (Drs. Brownstein, Ng, and Nusbaum) have now tested iodine levels in over 6,000 patients. Our results have been consistent; approximately 96% of patients test low for iodine. In fact, many patients initially test at severely low iodine levels (via spot urinary iodine) as their results are reported as 'below the detectable limits'. Dr. Jorge Flechas (the Dr. Jorge Flechas (the owner of FFP labs) and Charles Hakala, RPh, (owner of Hakala labs) have been at the forefront of testing people world-wide for their iodine levels. They have now tested tens of thousands of subjects and their results are consistent with mine.<sup>16</sup> Contact information for the labs that test iodine status is found in the appendix.

## FINAL THOUGHTS

Iodine deficiency is a huge public health problem. The continuing and increasing exposure to goitrogens (substances that promote goiter), including the halides bromide and fluoride, has exacerbated the iodine deficiency problem (more on this in [Chapter 11](#)). Iodine deficiency is one of the main underlying causes of many varied illnesses including thyroid disorders, chronic fatigue, fibromyalgia, cancer (including cancer of the breast and prostate), and other health issues. I believe that properly evaluating and treating iodine deficiency will not only help people improve the functioning of their immune systems, it will also play an integral role to help people achieve their optimal health.

[1](#) Stadel, B. Dietary iodine and risk of breast, endometrial and ovarian cancer. *The Lancet*. 4.24.1976

[2](#) DeLong, FR, et al. 1997 Effect on infant mortality of iodination of irrigation in water in a severely iodine-deficient area of China. *Lancet*. 350:771-773

[3](#) Foster, H. The iodine-selenium connection: Its possible roles in intelligence, cretinism, sudden infant death syndrome, breast cancer and multiple sclerosis. *Medical Hypothesis*. 40. 61-65. 1993

[4](#) WHO. IBID 3/27. 12 Nov. 1998

[5](#) WHO IBID 12 Nov. 1998

[6](#) Hollowell, JE et al. Iodine nutrition in the United States. Trends and public health implications: Iodine excretion data from National Health and Nutrition Examination Surveys I and III (1971-74 and 1988-94). *J Clin Endocrinol Metab* 83:3401-3408. 1998.

[7](#) Venkatesh, M, et al. Salt iodization for the elimination of iodine deficiency. 1995

[8](#) Abraham, G. Orthiodosupplementation: Iodine Sufficiency of the Whole Human Body. *The Original Internist*. December, 2002

[9](#) Dietary Reference Intakes (2001). Institute of Medicine

[10](#) Hollowell, JE et al. IBID. 1998.

[11](#) Pitman, JA. Changing normal values for thyroidal radioiodine uptake. *NEJM*. 1969; 280:1431-34

[12](#) Abraham, G. The Concept of Orthiodosupplementation and Its Clinical Implications. *The Original Internist*. June, 2004.

[13](#) Dunn, J. Editorial: What's happening to our iodine? *J. of Clinical Endocrin. And Metab.* Vol. 83, No. 10. 1998

[14](#) Vobecky, M. Effect of enhanced bromide intake on the concentration ratio I/Br in the rat thyroid gland. *Bio. Trace Element Research*, 43:509-513, 1994

[15](#) Abraham, G. Measurement of urinary iodide levels by ion-selective electrode: Improved sensitivity and specificity by chromatography on an ion-exchange resin. *Optimox Research Info. IOD-03*. 1.6.03

[16](#) Personal communication with Dr. Flechas and Charles Hakala. 11.15.08

## Chapter 3

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### Different Forms of Iodine

## CHAPTER 3: DIFFERENT FORMS OF IODINE

Iodine is not very soluble in water. Jean Lugol, a French physician, was interested in substances that could treat infections and became very interested in iodine because it showed promise in this area. In 1829, Dr. Lugol found that potassium iodide added to water increased the solubility of iodine. Dr. Lugol began using a solution termed “Lugol’s Iodine” that was a mixture of 5% iodine and 10% potassium iodide in water (see [Figure 6](#), next page). Two drops of 5% Lugol’s solution (0.1ml) contains 5mg of iodine and 7.5mg of iodide. Iodide is the reduced form of iodine which contains an extra electron.

Dr. Lugol began treating many different infections with his solution and had great success. Dr. Lugol’s recommended dose for a wide variety of problems was two drops per day of Lugol’s solution. This provided 12.5mg of iodine, which is very similar to the physiologic dose of iodine for sufficiency of the entire body. Dr. Lugol’s solution was widely available at apothecaries and was routinely prescribed for many different conditions.

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### Figure 6: Lugol’s Iodine Solution

10% Potassium Iodide

5% Iodine

85% Distilled Water

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## IODIDE AND IODINE

As mentioned above, it is very difficult to get iodine into a solution that uses water as a solvent. Therefore, as Dr. Lugol discovered, using the reduced form of iodine (iodide) increased the solubility of iodine. In order to do this, iodine must first be reduced to iodide. For the science majors, this means that the molecule of iodine has gained an electron, which allows it to form a salt with certain elements like potassium and sodium. In the case of Lugol’s solution, it is in the form of potassium iodide (10% in Lugol’s solution). When there is a full complement of electrons in the iodine molecule, it is referred to as iodide.

It was thought that the intestinal tract could easily convert iodine to iodide, but research has shown this is not true.<sup>1</sup> Different tissues of the body respond to the different forms of iodine. The thyroid gland primarily utilizes iodide while the breast tissue concentrates iodine. To decrease the incidence of goiter, potassium iodide was added to table salt.

*Donald, 49 years old, had Hashimoto’s disease for ten years. Donald was found to be hypothyroid and to have many nutritional deficiencies. He was treated with Armour® thyroid, vitamins and minerals, and diet changes—I asked him to eliminate refined carbohydrates and trans-fatty acids. “I am definitely feeling much better with the thyroid hormone. I felt like I was dying before. But, I still don’t feel like myself. I still have brain fog and some muscle aches,” he stated. Iodine testing showed that Donald was iodine deficient. He excreted only 35% of a challenge test of iodine (normal levels should be over 90%). Donald was initially treated with a form of iodide known as SSKI. He claimed, “I did not feel worse with the SSKI, I just did not feel better. I still had the brain fog while on it.” Donald was switched to a mixture of iodine and iodide (Iodoral®) and he noticed a definite change. Iodoral® is a tablet form of Lugol’s solution. “Within one week of starting the Iodoral®, my brain fog began to clear. I began sleeping better, my energy improved, and even my libido picked up. I feel almost totally back to normal. Two months after taking 25mg of Iodoral® per day, his iodine test improved dramatically (94.4% excretion). Update on Donald: After eight years of taking Iodoral®, he reported, “I feel fantastic. It still helps me feel better every day. I could not imagine being without it.”*

The breasts, on the other hand, primarily utilize iodine. Studies have shown that iodine deficiency can alter the structure and function of breast tissue.<sup>2</sup> This can include dysplasia and atypia that is the forerunner for breast cancer. Animal studies have shown that iodide (the form of iodine that is present in iodized salt) is ineffective at reversing the pre-cancerous lesions of animal breast tissue, whereas iodine is much more effective.<sup>3</sup> Research has also shown that iodine, not iodide, will decrease lipoperoxidation of breast tissue.<sup>4</sup>

Lipoperoxidation is a chemical reaction that can cause damage to the lipids of the cell membrane and mitochondria. This can lead to many serious illnesses such as cancer and autoimmune disorders. Lipoperoxidation has been found to be elevated in breast tumors and animal breast tissue exposed to agents that promote cancer. Iodine decreases lipoperoxidation in the body. This will be more fully explored in [Chapter 5](#).

Different body tissues concentrate different forms of iodine. As mentioned above, the breasts concentrate iodine. The prostate gland concentrates iodine. The thyroid gland and the skin primarily concentrate iodide. Other tissues, including the kidneys, spleen, liver, blood, salivary glands, and intestines can concentrate either form. With various body tissues responding to different forms of iodine, it would make common sense that a greater therapeutic benefit from iodine will be achieved by using a combination of iodine and iodide. My clinical experience has proven, beyond a doubt, that a combination of iodine/iodide (e.g., Lugol’s or tableted Lugol’s such as Iodoral® or Iodozyme HP®) is much more effective than an iodide-only supplement (e.g., SSKI and most other liquid iodide formulations).

*Leslie, a 43-year-old nurse, suffers with fibrocystic breast disease. “My breasts always hurt and before my period, I can’t even stand to have a shirt on. The rubbing of clothing is excruciating,” she said. Leslie had been to many doctors and was told to change her diet. She said, “Eliminating caffeine and chocolate did help somewhat, but I am still miserable.” When I saw Leslie, she not only had a severe case of fibrocystic breast disease, she also had cysts on her ovaries. Leslie commented, “I kept thinking that there must be something wrong with me. Why would I be getting all of these cysts in my body?” On examination, Leslie had an enlarged thyroid gland and many signs of an underactive thyroid condition, including being very fatigued. Laboratory testing showed severe iodine deficiency with a 12% excretion on an iodine-challenge test (normal levels should be above 90%). Upon taking iodine (in the form of an iodine/iodidemixture—Iodoral®), Leslie noticed a dramatic improvement in her condition. “Within two weeks of taking iodine, I had more energy and within one month, my breast cysts began to fade. After taking the iodine for two months, my breasts were soft and the lumpiness was gone. It no longer hurts to wear clothing. It feels like a miracle,” she said. The ovarian cysts Leslie had struggled with also resolved. Repeat testing of iodine levels showed a normal excretion rate on a challenge test (94% excretion). Leslie’s holistic treatment plan includes the use of vitamins, minerals, herbs, and natural hormones.*

*Update on Leslie’s condition: Leslie has been on iodine for over three years now. “I am 100% better. There is no sign of fibrocystic breast disease. I would like to tell everyone who suffers with this disease that there is a simple treatment—iodine. No one should suffer from this illness,” she said.*

*New 5<sup>th</sup> Edition Update on Leslie’s condition: At Leslie’s last visit, I told her I was writing an update to the iodine book. She became excited and said, “You must let your readers know how much it has changed my life. I was miserable before taking iodine. Every woman with fibrocystic breast disease should know about this.”*

Leslie’s case is not unique. The treatment of breast cysts with iodine has been reported for over 50 years. Most patients with breast cysts will significantly improve their condition with iodine supplementation. [Chapter 8](#) contains more information on the relationship between breast disease and iodine deficiency.

### FINAL THOUGHTS

I have used various iodide preparations for years, with mixed success. Although they are effective for certain conditions such as sinusitis, there is clearly an advantage to using a combination of iodide and iodine together. The results that I have seen in my patients have convinced me that using a combination of iodide and iodine is a much more effective and appropriate treatment than using iodide alone.

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<sup>2</sup> Eskin, B. Different tissue responses for iodine and iodide in rat thyroid and mammary glands. *Biological Trace Element Research*. Vol. 49, 1995

<sup>3</sup> Eskin, B. IBID. 1995

<sup>4</sup> Aceves, C. Is Iodine a gatekeeper of the integrity of the mammary gland? *J. of Mammary Gland Biol. and Neoplasia*. Vol. 10, No. 2. April 2005.

## Chapter 4

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### Iodine and the Thyroid Gland

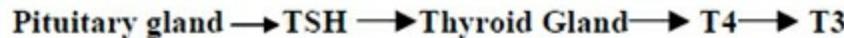
## CHAPTER 4: IODINE AND THE THYROID GLAND

Iodine is an essential ingredient in all of the thyroid hormones. T4 (thyroxine) contains four iodine atoms. T3 (triiodothyronine) contains three iodine atoms. Without sufficient iodine supply, the thyroid gland is unable to make thyroid hormones in adequate amounts.

The thyroid gland cannot optimally function in an iodine-deficient state. One of the consequences of an iodine-deficient state is goiter (swelling of the thyroid gland). Over a hundred years ago, it was shown that goiter could be avoided and often reversed with iodine. In addition to goiter formation, iodine deficiency may also lead to other thyroid conditions including hypothyroidism, autoimmune thyroid diseases such as Graves' and Hashimoto's disease, as well as thyroid cancer. Studies have shown that iodine-deficient individuals have an increased incidence of anti-thyroid antibodies.<sup>1 2</sup> This chapter will focus on the relationship between low iodine levels and hypothyroidism. More information about iodine and autoimmune thyroid illnesses and thyroid cancer can be found in the [Chapter 6](#).

Iodine is found throughout the body, with approximately 15-20mg stored in the thyroid of the average adult.<sup>3 4</sup> When body iodine levels are sufficient, the thyroid gland can hold up to 50mg of iodine. The thyroid gland requires adequate iodine levels to make thyroid hormone. The thyroid gland has developed a specialized system to concentrate a large amount of iodine as compared to its size. This system is known as the sodium/iodide symporter (NIS). There are other tissues of the body that utilize NIS to concentrate iodine including the breasts, kidneys, placenta, stomach, rectum, and salivary glands.<sup>5</sup>

The thyroid gland is located in the lower part of the neck and produces thyroid hormone. It is regulated by the pituitary gland which produces thyroid stimulating hormone—TSH. TSH stimulates the thyroid gland to release thyroxine (T4). Triiodothyronine (T3) is converted from T4 in the periphery of the body. T3 is believed to be the active form of thyroid hormone that drives the metabolic functions of the body. The Figure below illustrates how the thyroid gland produces thyroid hormone.



T4 and T3 are the most common thyroid hormones produced. The '4' in T4 and the '3' in T3 refer to the number of iodine atoms present. As previously stated, T4 has four iodine atoms present, while T3 has three iodine atoms present. The end result of iodine deficiency is severe. It can include a poorly functioning thyroid gland, goiter, increased autoimmune thyroid problems, and an increased risk of thyroid cancer.

Thyroid hormone is essential for normal brain development of the newborn. Since iodine is necessary for the production of thyroid hormone, an iodine-deficient state may predispose the newborn to abnormal brain development. In children, iodine deficiency can result in mental retardation, goiter, lowered IQ, attention deficit hyperactivity disorder (ADHD), and autism. Furthermore, fetal iodine deficiency is associated with increased rates of stillbirth, abortion, and congenital anomaly.<sup>6</sup> The World Health Organization stated that iodine deficiency is the single greatest cause of preventable mental retardation.<sup>7</sup> Research has found almost a 50% increase in perinatal mortality due to iodine deficiency.<sup>8</sup> When iodine deficiency is rectified, neonatal mortality has been shown to decline by over 50%.<sup>9 10</sup>

Many studies have shown that children who live in iodine-deficient areas have lower IQ's as compared to children living in iodine-sufficient areas. A large analysis comparing children in iodine-deficient and iodine-sufficient areas showed a 13.5 point difference in IQ score.<sup>11</sup>

*Janet, age 57, had been treated for hypothyroidism for two years. She was found to be deficient in iodine and given a therapeutic trial of a combination of iodine and iodide (Iodoral®). I asked her to write a letter to me about her experience with iodine. She wrote the following letter:*

*"After taking Armour® thyroid for over two years, I began to feel somewhat sluggish and felt that perhaps I needed more thyroid hormone. Dr. Brownstein told me to take two tablets of iodine (Iodoral®—25mg) with my thyroid medicine. It has been over five months since I began the iodine treatment and I still feel the perkiness everyday that I have been looking for. In fact, I started to feel better the first day that I took the iodine. The iodine certainly was needed. I am just thrilled about how much better I feel."*

### WHAT ABOUT IODIZED SALT?

As mentioned in [Chapter 2](#), iodine was added to iodized salt over 70 years ago to combat goiter and cretinism. The RDA to combat these illnesses was established (150ug/day) with one goal in mind: prevent goiter and cretinism. The RDA for iodine has been successful at combating goiter and cretinism; however, the RDA is woefully inadequate in preventing many other thyroid disorders including hypothyroidism, Graves' disease, Hashimoto's disease, and thyroid cancer. Furthermore, the RDA for iodine fails to provide optimal amounts of iodine for the rest of the body's iodine needs. Finally, our increasing exposure to toxic halogens—bromide, fluoride, and chlorine derivatives—have markedly increased our iodine requirements. Other illnesses associated with iodine deficiency (e.g., breast cancer, fibrocystic breast disease) are covered in other chapters.

### HOW COMMON ARE THYROID PROBLEMS?

Thyroid illnesses are found at ever increasing numbers. Recent studies have estimated that 10% of the adult population of the United States (13 million) may have laboratory evidence of thyroid disease.<sup>12</sup> I have written in my book, **Overcoming Thyroid Disorders, 3<sup>rd</sup> Edition**, that I believe these numbers are too low and a more accurate estimate would probably approach 30-40% of the population (up to 52 million adult Americans).<sup>13</sup> Why the discrepancy? Conventional medicine diagnoses a thyroid problem based solely on the blood tests. I feel that the blood tests are not sensitive enough to pick up thyroid abnormalities in the vast majority of patients suffering from thyroid problems. Therefore, a holistic approach to diagnosing a thyroid issue, as I outline in my book, is a much more comprehensive way to diagnose a problem that affects every single cell in the body.

Why is adequate thyroid hormone so important? Every single cell, muscle, and organ in the body depends on adequate thyroid hormone levels for optimal functioning. Thyroid hormone acts as the body's major metabolic regulator. In a low thyroid state, known as hypothyroidism, the thyroid gland is releasing inadequate amounts of thyroid hormone to meet the body's metabolic demands, and the metabolic rate is therefore reduced. In a hyperthyroid state, the thyroid gland is releasing excess amounts of thyroid hormone that results in an elevated metabolic rate.

Why do so many people across this country and the world have a serious problem like a thyroid disorder? Although the etiology of thyroid illness can be varied, one common denominator that could explain this epidemic is iodine deficiency.

As previously discussed in [Chapter 2](#), one-third of the world's population lives in an iodine-deficient area by World Health Organization (WHO) standards. This large number of people living in an iodine-deficient area closely correlates with the estimates for the number of people who have thyroid disorders. All individuals with a thyroid disorder should be screened for iodine deficiency.

### **WHAT DOES IODINE DO IN THE THYROID GLAND?**

Iodine is responsible for maintaining the normal architecture of the glands of the body including the thyroid, ovaries, uterus, breast, and prostate. When the cells of the glandular tissue have enough iodine, the tissue maintains a normal structure.

When iodine is deficient, the architecture of the glandular tissue becomes disrupted and the tissue becomes cystic. Cysts are fluid-filled sacs that have a distinct border from the surrounding normal tissue. When palpated, cysts are generally soft and compressible.

If iodine deficiency persists, the cysts become nodular—that is, they become more firm upon palpation. If iodine deficiency continues, the nodules start to change their histological appearance to become hyperplastic. Hyperplasia literally means ‘over-formation’. In a hyperplastic state, the cells start to multiply rapidly and take on an increasingly disordered appearance when viewed microscopically. Eventually, if iodine deficiency is not corrected, the end stage of this continuum can be cancer.

[Chapter 8](#) will discuss fibrocystic breast disease and iodine deficiency. Fibrocystic breast disease is a precursor to breast cancer. I have successfully treated many fibrocystic breast disease patients with iodine. I feel that cysts on any glandular tissue should prompt a physician to check the patient's iodine status and to prescribe iodine, if indicated, to reverse the process.

In the thyroid gland, iodine deficiency results in the formation of cysts, nodules, and goiter. The thyroid gland does not function optimally when the normal architecture is disrupted. I have treated hundreds of patients for growths in their thyroid and other glandular tissue that resolve or get significantly better with iodine therapy.

*Lexi is a 15-year-old girl who was diagnosed with thyroid cysts and nodules one year previously. Her thyroid was two-times the normal size. At our first visit, I could see Lexi's thyroid protruding out of her neck. Lexi had seen two endocrinologists who both recommended surgery. Lexi's mother commented, “I really don't want her to have surgery, but they are offering me nothing. We have been following her thyroid ultrasounds and it just keeps getting bigger. I have a surgery date already scheduled for three weeks from now unless you tell me otherwise,” she said. At our first visit, I asked Lexi how she was feeling. She did not have any major complaints. Her energy level was good and she was very active in school activities. I told Lexi and her mother that surgery was not warranted yet; the enlarged thyroid had not caused any problems. After my exam, I ordered a spot urine iodide level and a 24-hour urinary iodide loading test. Lexi's spot urine iodide was below the laboratory detectable limits. Her 24-hour loading test was also low at 50% excretion (normal 95%). At this point I prescribed iodine—25mg/day, unrefined salt (1tsp/day of Redmond's Real Salt), and a multivitamin (Optivite). Two weeks later, Lexi had another ultrasound of her thyroid because both she and her mother—who is an ultrasound technician—felt the thyroid was visually smaller. The ultrasound showed a 50% reduction in the overall size of her thyroid and all the cysts and nodules were shrinking. “The radiologist called in two other colleagues to look at the ultrasound as he could not believe how much it had shrunk,” Lexi's mother commented.*

I have seen countless patients with cysts, nodules, and disrupted architecture of glandular tissue—including the breasts, ovaries, uterus, and prostate improve or dramatically reverse their condition with iodine supplementation. In many cases, iodine supplementation results in a cure. How long does this process take? For most patients, three to six months is a reasonable time period to see results. Severely ill patients may take years to see results.

### **HYPOTHYROIDISM**

The thyroid gland controls the metabolic activity of the body. When there is adequate thyroid hormone available for the cells of the body, there is a normal metabolic activity present. By contrast, in a hypothyroid state, the metabolic activity of the body is

lowered. [Table 4](#), on the following page, lists some of the signs and symptoms related to hypothyroidism.

The main thyroid hormones, T4 and T3, require sufficient iodine in order to be produced. In an iodine-deficient state, hypothyroidism is the expected outcome as thyroid hormone will not be manufactured. My research has shown that iodine levels need to be investigated in all hypothyroid individuals. If iodine is found to be deficient, many times, supplementing with iodine can improve or even cure the hypothyroid condition without the use of exogenous thyroid hormone.

Iodine and thyroid hormone have a synergistic action in the hypothyroid patient. When it is indicated, it is more effective to use iodine along with thyroid hormone to achieve the best results.

*Karen, age 50, suffered with hypothyroidism for 15 years. Her symptoms included fatigue, mental confusion, puffiness, and hair loss. I diagnosed Karen with hypothyroidism three years ago and began treating her with Armour® thyroid as well as a combination of vitamins, minerals, and herbs. She noticed a significant improvement in her symptoms when she began taking Armour® thyroid. "I feel like I got my life back. I could think much more clearly and my energy level started to improve," she said. Karen's daughter, Lisa (22 years old) had similar symptoms and was diagnosed with hypothyroidism two years ago. She had similar positive results with thyroid supplementation. Four months ago, the laboratory tests showed both Karen and Lisa had iodine deficiency. Three months after starting iodine supplementation, I received a letter from Karen that said in part, "Lisa and I take Armour® thyroid and we have had much success with that, but adding iodine really made a difference. We have more energy and it is much easier to get up in the morning. The muscle stiffness I occasionally experienced is gone. As you know, I spent three weeks in California with my mom who had undergone surgery for colon cancer. I was in a bed other than my own and I was on a different time schedule. I wasn't getting much sleep and the stress level was very high. In the past, a situation like that would have exhausted my body and I would be aching all the time. Not this time! In spite of everything that was going on, I felt great. I attribute that to the iodine, because it is the only change I have made since being in California. Lisa's experience has been similar. She is in college and has a very irregular schedule. Since she started taking iodine, I have noticed a big difference in her energy level. She actually wakes up on her own and has much more energy during the day and night." After two months of therapy, I had asked Karen and Lisa to reduce their iodine dosage slightly and they did not feel as good. "When Lisa and I cut down our dosage of iodine, we gradually noticed we did not feel as well. At your recommendation, we increased the dosage and began to feel as good as we were before," Karen wrote. Karen and Lisa's experience is very common for many of my other patients. As is the case with Karen and Lisa, optimal thyroid function is dependent on having adequate iodine ingestion.*

**Table 4: Signs and Symptoms of Hypothyroidism**

<b>Brittle nails</b>	<b>Hypotension</b>
<b>Cold hands and feet</b>	<b>Inability to concentrate</b>
<b>Cold intolerance</b>	<b>Infertility</b>
<b>Constipation</b>	<b>Irritability</b>
<b>Depression</b>	<b>Menstrual irregularities</b>
<b>Difficulty swallowing</b>	<b>Muscle cramps</b>
<b>Dry skin</b>	<b>Muscle weakness</b>
<b>Elevated cholesterol</b>	<b>Nervousness</b>
<b>Essential hypertension</b>	<b>Poor memory</b>
<b>Eyelid swelling</b>	<b>Puffy eyes</b>
<b>Fatigue</b>	<b>Slower heartbeat</b>
<b>Hair loss</b>	<b>Throat pain</b>
<b>Hoarseness</b>	<b>Weight gain</b>

#### **IODINE AND THYROID SUPPLEMENTATION**

It has been over 20 years since I started studying and practicing holistic medicine. During this time, every new patient who comes to see me receives a full thyroid and hormonal evaluation. Helping a patient balance their hormonal status has proven to be one of the most rewarding things I do in the practice of medicine. I did not learn how to properly use iodine in treating these patients until about ten years ago. Over the first ten years of my holistic practice, I diagnosed many patients with hypothyroidism. Needless to say, I treated many of these patients with thyroid hormone.

During this time, I was frustrated. Although most patients were doing better, I could not believe that so many people were

suffering from thyroid problems. I did not want to treat every patient with thyroid hormone. I wanted to find an underlying reason why so many patients were suffering from thyroid issues.

At first I looked for nutritional deficiencies such as selenium, iodine, vitamin A, vitamin D, and vitamin C. Although I tried to correct these deficiencies, my patients were not responding until I gave them thyroid hormone.

Approximately 10 years into this practice I met my mentor on iodine—Dr. Guy Abraham. He showed me the form of iodine I was using—iodide—was not the most efficacious form and he taught me how to measure iodine levels. Furthermore, Dr. Abraham's research was clear; whole-body iodine sufficiency was best achieved by using both iodine- and iodide-containing products.

Only when I started using the correct form of iodine—in combination with iodide—was I able to reduce my use of thyroid hormone.

My practice now is much different than it was 20 years ago. Hopefully, I have become a little wiser (some may disagree with that). Now, every patient has their iodine levels assessed. If I diagnose a patient with hypothyroidism, I do not start thyroid hormone therapy until they have sufficient iodine levels. This has allowed me to use much smaller thyroid hormone dosing. Twenty years ago, my average thyroid dose was 120-180mg/day of desiccated thyroid hormone. Now, it is 30mg/day.

### **WHAT TO DO IF YOU ARE ALREADY TAKING THYROID HORMONE: RULE OF THIRDS**

If someone is already taking thyroid hormone and they are diagnosed with iodine deficiency, the ‘rule of thirds’ comes into play. These patients may need to:

- Maintain the same thyroid hormone dose
- Reduce their thyroid hormone dose in half
- Stop taking thyroid hormone

The problem is, when starting iodine therapy, I do not know which of the three groups an individual patient will fall into. I tell my patients if, upon starting iodine therapy, they become nervous, anxious, or develop palpitations, they need to immediately cut their thyroid hormone dose in half. If the above symptoms still persist, it is best to stop the thyroid hormone.

Following patients closely can minimize complications. In addition, performing an appropriate exam and checking blood tests can help guide the process.

### **WHY DOES TSH INCREASE WHEN STARTING IODINE THERAPY?**

One of the most frequent e-mails I receive from physicians and laypeople is their concern about TSH levels elevating after beginning iodine therapy. As previously mentioned, TSH is released by the pituitary gland to stimulate the thyroid gland to produce thyroid hormone.

However, TSH has another function besides stimulating thyroid hormone production. It also helps stimulate the body's production of the iodine transport molecules—the sodium-iodide symporter-NIS. Without adequate amounts of NIS, iodine would not be able to enter the cells and be utilized.

In other words, the NIS is like a taxi cab that shuttles the iodine from the blood stream into the thyroid cell in order for the cell to use the iodine to make thyroid hormone.

This concept is not hard to grasp. Let's take the example of a patient who is iodine deficient. This iodine-deficient patient's body does not require a large amount of NIS since there is little iodine that needs to be transported into the cells. However, when this individual begins to supplement with iodine, the extra iodine now needs to be transported into the cells. One way the body will accomplish this is to increase the production of TSH to stimulate more NIS. In other words, when iodine supplementation is started, the body will produce more “NIS taxi cabs” to shuttle the iodine into the thyroid cell in order to produce thyroid hormone.

My experience has shown, when iodine supplementation has begun, an elevated TSH without clinical signs of hypothyroidism (i.e., fatigue, hair loss, headaches, etc.) as well as normal T3 and T4 levels does not indicate a hypothyroid condition. On the contrary, the elevated TSH is the body's appropriate and necessary response to produce more NIS or “taxi cabs” to increase the transport of iodine into the thyroid cells. How long does TSH stay elevated? I have found that TSH may remain elevated for up to 6 months before lowering to normal.

How high do TSH levels rise? The normal TSH level ranges from 0.5-4.5mIU/L. I have witnessed TSH levels elevated to 5-30mIU/L for a period of time—sometimes up to six months—before falling back to the normal range. Remember, if there are no clinical symptoms of thyroid problems and T3 and T4 levels are normal, it is doubtful that TSH elevation is sign of hypothyroidism. In this case, TSH elevation is normal and expected. The TSH will decline back to the reference range after the thyroid gland is saturated with iodine.

### **IODINE-INDUCED HYPOTHYROIDISM**

I, and my partners, have treated thousands of patients, autoimmune thyroid (AIT) disease patients included, and we have not seen an epidemic of iodine-induced hypothyroidism. In fact, as I was going to print with this book, I queried my partners on this

issue, and we came up with two cases of iodine-induced hypothyroidism. Keep in mind that is only two out of over thousands of patients treated with iodine.

Most doctors and some holistic doctors do not seem to understand the concept of how the TSH rises with the initiation of iodine therapy. Allow me to repeat myself: Increasing TSH levels, without falling T3 and T4 levels and clinical signs and symptoms, do not indicate iodine-induced hypothyroidism. Finally, it is worth repeating—TSH levels initially rise in nearly all who start iodine therapy. This is a normal and expected response.

### **IODINE-INDUCED HYPERTHYROIDISM**

Does iodine therapy cause hyperthyroidism? I was taught in medical school that it did, especially in patients suffering from autoimmune thyroid disorders such as Graves' or Hashimoto's disease. Young doctors-in-training are still taught this today. So, let me answer the question: Very rarely. Between my partners and myself, we estimate that over 12 years, less than 10 patients out of thousands treated became hyperthyroid when treated with iodine.

When I lecture to doctors, I tell them one particular condition can predispose to iodine-induced hyperthyroidism. This condition occurs in a patient who has an autonomously functioning nodule in their thyroid. Sometimes this is referred to as a hot nodule on a thyroid scan.

An autonomously functioning nodule is not under the feedback control of the pituitary and the hypothalamus. It functions independently of the thyroid gland. When iodine is present, these nodules can take up the iodine and produce copious amounts of thyroid hormone leading to hyperthyroidism. This condition can be diagnosed with a thyroid scan. However, it is most frequently diagnosed after a trial of iodine therapy is given and the patient becomes hyperthyroid after taking the first couple of doses.

How do you treat a patient with an autonomously functioning thyroid nodule? These patients must avoid iodine supplements and food (such as seaweed) that is high in iodine until the nodule is surgically removed.

Even less frequently, I see iodine cause hyperthyroidism in a patient without an autonomously functioning thyroid nodule. However, iodine can cause adverse effects, including symptoms of hyperthyroidism such as nervousness, jitteriness, palpitations, etc., from a detoxification reaction. When this occurs, in most cases, it is due to iodine displacing the toxic halide bromine. Bromine toxicity can display all the symptoms I mentioned above. More about bromine toxicity can be found in [Chapter 11](#).

### **BREAST CANCER: THE PROBLEM WITH TAKING THYROID HORMONE WHEN IODINE DEFICIENCY IS PRESENT**

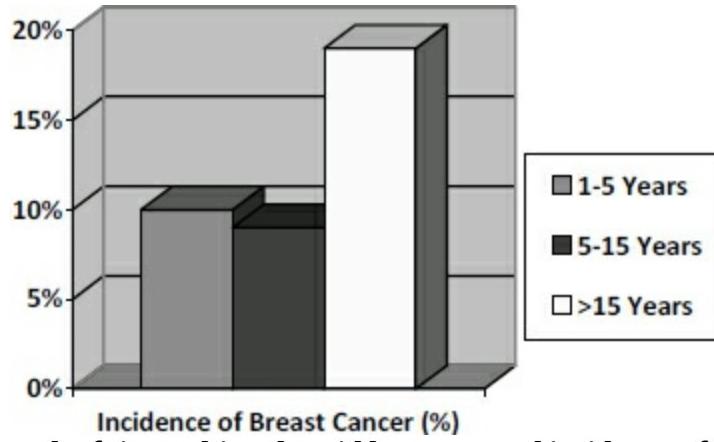
One of the main jobs of thyroid hormone is to stimulate the metabolism of the body. In hypothyroidism, the metabolism of the body is slowed down. Consequently, excess weight gain is common in hypothyroidism. Conversely, in hyperthyroidism, the metabolism of the body is accelerated and weight loss is more common.

Iodine is not only necessary for thyroid hormone production, it is necessary for the production of all the hormones of the body. Every gland concentrates iodine and utilizes iodine to manufacture hormones. Furthermore, every cell depends on adequate iodine stores for the cell machinery to run optimally.

When thyroid hormone is taken, all the cells of the body are affected by it. In effect, thyroid hormone raises the metabolism of every cell in the body. The elevated metabolic rate naturally increases the body's need for iodine. Therefore, if iodine is deficient, supplementing with thyroid hormone will exacerbate the iodine-deficient problem.

Researchers have looked at the link between hypothyroidism and breast cancer for over 40 years. There are researchers who feel that thyroid illnesses, including hypothyroidism and Hashimoto's disease are associated with the development of breast cancer. On the other hand, researchers have reported that women who take thyroid hormone for at least 15 years have an increased risk for developing breast cancer.

One study compared women taking thyroid hormone versus women not taking thyroid hormone.<sup>14</sup> As compared to women who never took thyroid hormone, the women taking thyroid hormone had a 50% increased incidence of breast cancer. This same study found that breast cancer incidence was linearly increased the longer the time period that the women took thyroid hormone. This is illustrated in [Figure 7](#).



**Figure 7: Length of time taking thyroid hormone and incidence of breast cancer.**

What is the link between an increased breast cancer risk in both women who took thyroid hormone for a long time period and women who had hypothyroidism? I think the common link is iodine deficiency. In an iodine-deficient state, taking thyroid hormone elevates the metabolic rate of the body which also increases the body's need for iodine. When iodine deficiency is present, the longer that thyroid hormone is taken, the worse the iodine-deficiency problem will be. In women, this worsening problem is reflected in an increased breast cancer rate. Presently, we are facing an epidemic of breast cancer where one in seven U.S. women are suffering from it. It is my hypothesis that this epidemic will not be solved until the iodine connection is identified and treated. More information about iodine and breast cancer can be found in [Chapter 8](#).

### FINAL THOUGHTS

The thyroid gland will not function optimally when iodine deficiency is present. Thyroid hormone production, like all the other hormones of the body, requires iodine. Sadly, iodine deficiency is occurring at epidemic rates, whether by my own research or the National Health and Nutrition Examination Survey.

Hypothyroidism is occurring at epidemic rates. However, thyroid hormone supplementation should not be instituted without measuring iodine status. Taking thyroid hormone when iodine deficiency is present can worsen the iodine deficiency problem by increasing the body's metabolic rate.

The research is clear; taking thyroid hormone when iodine deficiency is present increases the risk for breast cancer and, I believe, other glandular cancers including breast, ovary, uterine, and prostate. This increased risk could be predicted as the glandular tissue requires iodine to maintain their normal architecture. Anything that lowers the body's iodine stores or increases the body's need for it could be predicted to cause an increase in breast cancer—as well as cancer of the other glands.

All individuals with a thyroid problem should have their iodine levels checked. If iodine levels are suboptimal, iodine replacement with the correct form of iodine should be instituted. My experience has clearly shown that the appropriate use of iodine in treating thyroid disorders, from hypothyroidism to Graves' and Hashimoto's disease, is not only safe, but effective and inexpensive. What I have outlined for you is a holistic approach to search for and treat an underlying cause of thyroid problems.

Iodine replacement is not the only therapy for thyroid illness. Nutritional supplementation, detoxification, drinking adequate amounts of water, and dietary changes can also improve these conditions. For more information on a comprehensive holistic plan to treat thyroid disorders, I refer the reader to my book, [\*\*\*Overcoming Thyroid Disorders, 3rd Edition.\*\*\*](#)

Keep in mind that an elevated TSH when starting iodine therapy does not necessarily mean that iodine is causing an adverse effect. On the contrary, for most patients, this is a normal and expected response if the other thyroid hormone levels are normal and there are no clinical signs of hypothyroidism.

The next three chapters will expand on the concept that deficiency of iodine is one of the major causes of autoimmune thyroid disorders. Remember, once you understand the cause of an illness you can formulate an effective treatment plan. These chapters will identify the cause(s) of autoimmune thyroid illness and present a treatment plan designed to stop the progression as well as reverse autoimmune thyroid disorders.

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## Chapter 5

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### *The Oxidation and Organification of Iodine*

## CHAPTER 5: THE OXIDATION AND ORGANIFICATION OF IODINE

Approximately seven years ago, after I gave a lecture about iodine to a group of doctors in Houston, TX, a physician from Australia, Dr. John Lee, asked me a question. His question sounded simple enough: "David, what does iodine do in the cell?" At that time, I answered the question to the best of my knowledge, but I knew the answer did not satisfy him or me. That started me on a quest to better answer this question. Although we still don't know everything that iodine does in the cell, there are many more answers now.

This chapter will discuss the oxidation and organification of iodine. I know this is a difficult concept to master. I feel it is important to appreciate what happens to iodine inside the cell and what iodine does inside the cell in order to understand why it is so important to ensure adequate iodine levels.

### WHAT HAPPENS TO IODINE AFTER IT IS INGESTED?

After iodine and iodide are ingested, they are absorbed from the gastrointestinal tract by the halide channel. Iodine is transferred inside the cell by facilitated diffusion. Iodide is transported into the cells via a transport molecule called the sodium-iodide symporter (NIS). After iodide is transported into the cell, it undergoes two important processes: oxidation and organification, which will be explained in this chapter.

*John, age 58, was diagnosed with fibromyalgia two years ago. "I don't know what happened. One day I was okay and the next day I ached all over and I was tired. John saw numerous doctors who prescribed various medications. "The drugs did not help. I kept telling my doctors I wasn't depressed but they kept prescribing antidepressants. I finally got sick and tired of taking the drugs," he said. When John saw me, I found his thyroid gland to be enlarged. I ordered an ultrasound of his thyroid gland and blood work and diagnosed him with Hashimoto's disease. "When I found out I had Hashimoto's disease, I couldn't believe it. I had been seeing many different doctors and they couldn't tell me what was wrong. They kept telling me I needed to be on an antidepressant medication," he said. As part of the initial exam, I tested John's iodine level. John's iodine loading test was found to be low at 45% (normal >90%). John was placed on 75mg of iodine/day along with a complete nutritional program. After twelve weeks of taking iodine, a follow-up 24-hour iodine loading test was now normal at 95% excretion. However, he did not feel better. John was still complaining of fatigue and body aches. Furthermore, John's TSH increased from a baseline of 4mIU/L to 12 mIU/L after taking 75mg of Iodoral® for 30 days. At this time, John had normal T3 and T4 levels. John's endocrinologist placed him on thyroid hormone (Synthroid®) for the elevated TSH level. The Synthroid® had no effect on his symptoms. When I saw John, I explained to him that the elevated TSH was a normal result of the body producing more iodine transport molecules (NIS). Because he was not feeling better, I felt that he may be having an organification problem with the iodine. I explained to him that his cells were unable to effectively utilize iodine. After placing him on Vitamins B2 (100mg) and B3 (500mg) two times per day, John noticed an immediate improvement. "It was a miracle. With the second dose of the B-vitamins, my head cleared and all my fatigue went away. I felt 20 years younger. I have never taken anything that works that quickly," he said. John has continued to take iodine (now 50mg/day) in addition to vitamins B2 (200mg/day) and B3 (1,000mg/day). His thyroid antibody levels gradually lowered to normal levels over the next six months. Most importantly, John now feels well. "I can't believe how much energy I have. Everybody has noticed the difference," he claims.*

John's story is not unique. Ensuring optimal oxidation and organification of iodine improves the immune system function and energy production.

[Figure 8](#) (next page) shows what happens to iodide once it enters the thyroid gland. Once iodide is transported into the thyroid cell, it undergoes oxidation. This is the process whereby iodide (the reduced form of iodine) is oxidized to iodine. What this means is that iodide is relieved of one electron which results in the production of iodine, as illustrated in [Figure 8](#).

The oxidation process occurs through the interaction of hydrogen peroxide ( $H_2O_2$ ) with thyroperoxidase (TPO). This step is a very important process in the body's ability to utilize iodide.

Abnormalities of the oxidation of iodide can result in the production of anti-thyroperoxidase antibodies (anti-TPO). This leads to a condition called Hashimoto's disease. More about Hashimoto's disease will be discussed near the end of this chapter.

**FIGURE 8: The Oxidation of Iodide**



### Hydrogen Peroxide: An Essential Element for Oxidation

Adequate hydrogen peroxide production is essential for facilitating the oxidation of iodide. Without adequate hydrogen peroxide production, iodine will not be formed from iodide. Hydrogen peroxide is a potent oxidizing agent. In the thyroid cell, its function is to oxidize iodide to iodine (Figure 8). Hydrogen peroxide along with TPO is essential for this step.

If the production and utilization of hydrogen peroxide is not closely maintained, it can damage tissue and cause autoimmune thyroid disorders such as Hashimoto's disease. The immune system has developed defense mechanisms to keep  $H_2O_2$  from harming tissues. This is primarily done with the selenium-containing enzyme glutathione peroxidase which functions to keep hydrogen peroxide reduced to  $H_2O$  after it oxidizes iodide.<sup>1 2</sup> A deficiency of selenium can impair this defense mechanism. More about selenium can be found in [Chapter 7](#).

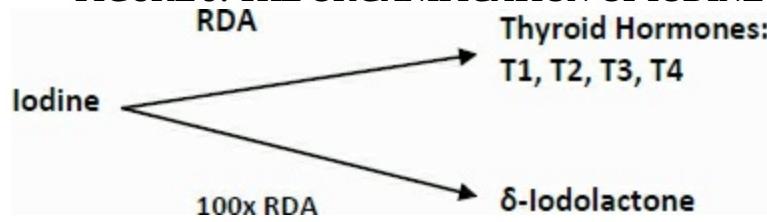
If the oxidation process occurs correctly, the next step in the utilization of iodine is called organification.

### THE ORGANIFICATION OF IODINE

Once iodine is formed, it undergoes organification and becomes part of cholesterol, lipids (fats), and proteins (Figure 9, next page). Organification simply means being bound to an organic molecule. As can be seen from Figure 9, iodine in RDA amounts—150 $\mu$ g/day—can be bound to thyroglobulin and make thyroid hormones—T1, T2, T3, and T4. However, it takes larger doses of iodine—at least 100x the RDA for iodine—to produce the important iodo-lipids such as  $\delta$ -iodolactone.

At 100x the RDA, iodine can be organified to lipids in order to produce  $\delta$ -iodolactone and other iodo-lipids.  $\delta$ -iodolactone, as well as the other iodo-lipids will not be formed in any appreciable amounts when iodine is taken in RDA amounts. Simply put, RDA amounts of iodine barely give the cell enough iodine to make thyroid hormone and prevent goiter.

**FIGURE 9: THE ORGANIFICATION OF IODINE**



Rick, a 52-year-old physician was very active in his daily life. He played tennis twice per week and exercised daily. "I feel good most of the time, but I still have my ups and downs," he said. Rick was diagnosed with Hashimoto's disease 15 years ago. Since that time, his main problem was maintaining his concentration. He claims, "Although I can still do everything, my brain has never felt the same after Hashimoto's disease came along." Rick was on a holistic treatment regimen of vitamins, minerals, and eating a good diet for years. When Rick added in iodine (75-100mg/day), he immediately noticed the difference. Rick stated that, "Ninety percent of my complaints melted away with the iodine. It was miraculous." After two years of taking the iodine, Rick was tested via blood, urine, and saliva and we found that he had an organification defect with iodine. That means his cells were not properly utilizing the iodine he was supplementing with. Upon taking two doses of a supplement containing 100mg of Vitamin B2 and 500mg of Vitamin B3 (ATP CoFactors<sup>®</sup>) he felt "fabulous". "I have never felt that good with just starting a new supplement. This cleared up all my nagging complaints. I now feel 100% healthy," he said.

Rick is my partner, Dr. Richard Ng. His story is not an isolated story. If there is an inability to organify or oxidize iodine, the body will not receive the true benefits of it. It is important to keep searching for answers if you are not receiving the best results with iodine therapy. Rick was not satisfied until he felt 100% well.

### AT THE RDA FOR IODINE: PRODUCTION OF THYROID HORMONE

When iodine is taken in amounts consistent with the RDA—approximately 150 $\mu$ g/day—iodine can be bound to thyroxine molecules and become thyroid hormone. If there is insufficient iodine to accomplish this, it can lead to an inadequate production of thyroid hormone and a hypothyroid state. The different thyroid hormones are shown in Figure 9.

## AT 100X THE RDA FOR IODINE: PROTECTION FROM CANCER

When iodine is taken in amounts at least 100x the RDA (>15mg/day), iodine can now also bind to other molecules including lipids (i.e., fats) and proteins. The binding of iodine to the fat molecule lactone results in a fat-like substance known as  $\delta$ -iodolactone.  $\delta$ -iodolactone is a key regulator of apoptosis and cellular proliferation of the thyroid gland.<sup>3 4</sup> In other words,  $\delta$ -iodolactone is an anti-cancer substance. Apoptosis refers to the programmed cell death that all of our normal cells have.

### IODINE AND APOPTOSIS: PROTECTION FROM CANCER

Apoptosis is a very important concept. All cells, like all living things, have a life cycle. All cell life cycles have a growth phase, a division phase, and a death phase. After a cell dies, it is replaced by a new cell. We want our cells to undergo apoptosis or programmed death. Without apoptosis, cells will continue to divide until they overwhelm the body. Cancer cells are examples of cells that do not undergo apoptosis. One of the mysteries of cancer is why these cells do not undergo apoptosis. A potent anticancer item would be one that would promote apoptosis of cancer cells, without toxicity to other cells.

Iodine is one of these nutrients. We know that iodinated lipids such as  $\delta$ -iodolactone have been shown to regulate and promote apoptosis. Common sense would lead one to conclude that it is important to ensure adequate iodine intake in order to promote the production of iodinated lipids such as  $\delta$ -iodolactone. These iodinated proteins are not detected in human tissue when iodine deficiency is present. However, they are detectable when iodine is taken well in excess of the RDA for iodine.

It is important to emphasize that the apoptotic (i.e., anti-cancer) effect of iodine only occurs when iodine is ingested with doses in excess–100x–of the RDA for iodine. Similar effects have also been shown to occur in animals (dogs) as well.<sup>5</sup> I believe one of the major reasons we are seeing a significant increase in cancer of the iodine dependent tissues (including the thyroid, breasts, ovaries, and prostate) is due to a deficiency of iodine resulting in non-apoptotic cells as well as a suboptimal environment for oxidation and organification.

### PUTTING IT ALL TOGETHER: WHAT DOSE OF IODINE IS THE BEST FOR PROTECTING AGAINST CANCER?

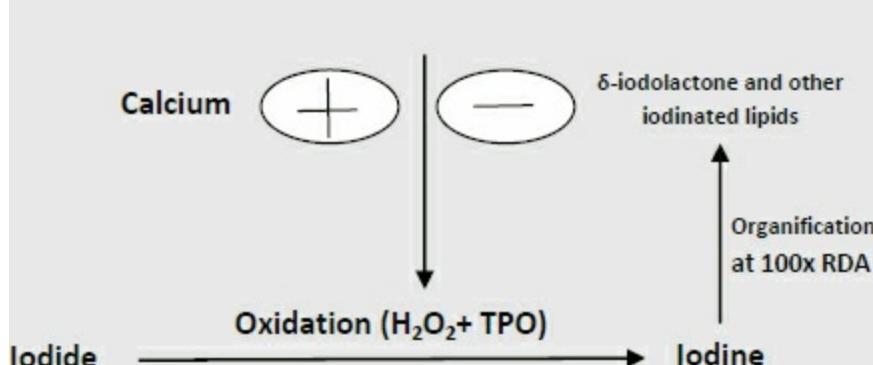
If we want to achieve the proper oxidation and organification of iodine, it becomes clear that the RDA for iodine is woefully inadequate to provide the apoptotic (i.e., anti-cancer) effect. In fact, I believe the RDA for iodine is not only inadequate for providing the apoptotic effect of cells throughout the body, it is also inadequate to provide for the total needs of even the thyroid gland. As mentioned previously in this book, the exposure to toxic halides--bromine, fluoride, and the chlorine derivatives--have been increasing over time. These items not only cause iodine deficiency, they can poison the enzymes responsible for organizing iodine.

### THE UNDERLYING CAUSE OF AUTOIMMUNE THYROID ILLNESSES: IODINE DEFICIENCY AND ANTIOXIDANT DEFICIENCY

I have already described the apoptotic (i.e., anticancer) effects of the iodinated form of lactone  $\delta$ -iodolactone.  $\delta$ -iodolactone is not only important for preventing cancer, its production is also necessary to help regulate the oxidation of iodine. [Figure 10](#) (next page) illustrates this regulatory step in the oxidation/organification of iodine.

As previously mentioned, the oxidation of iodide to iodine occurs through the interaction of  $H_2O_2$  and TPO. Iodine is a necessary product in order to provide the correct molecule in the cell so that organification can occur. If organification does not take place or is blocked, thyroid hormone and iodo-lipids will not be formed. As can be seen from [Figure 10](#), this reaction is controlled by intracellular calcium levels and iodinated lipids— $\delta$ -iodolactone.

**FIGURE 10: ORGANIFICATION OF IODINE AT 100x RDA  
NADPH-Oxidase System**



Intracellular calcium stimulates this pathway.<sup>6</sup> On the other hand,  $\delta$ -iodolactone and other iodinated lipids act as a brake on the system.<sup>7,8</sup> If there is not enough iodine in the cell to organify and produce adequate amounts of  $\delta$ -iodolactone, it can set the stage for damage to the thyroid cell and the development of an autoimmune thyroid disorder such as Hashimoto's or Graves' disease.

### A Proposed Mechanism For The Development Of Autoimmune Thyroid Disorders

The NADPH oxidase system is found in the mitochondria of our cells. The mitochondria are the energy-producing cells of our body. The mitochondria produce energy (i.e., ATP) through a complex process called oxidative phosphorylation. All medical students (and most physicians) are familiar with oxidative phosphorylation because we have to memorize the many steps responsible for producing ATP. This production of ATP requires many items including: oxygen, magnesium, ADP, vitamins, and amino acids.<sup>9,10</sup>

Many people with chronic illnesses, such as fibromyalgia, chronic fatigue syndrome, and autoimmune disorders, complain they have no energy. ATP is the molecule that stores energy for the body. The body is constantly producing and utilizing ATP. Its production is a complex process that is beyond this book. However, there are two cofactors, vitamins B2 (riboflavin) and B3 (niacin), that are integral to stimulating oxidative phosphorylation and ATP production.

Hydrogen peroxide is a byproduct of oxidative phosphorylation.<sup>11</sup> It is this production of hydrogen peroxide that is so critical to the oxidation process of iodine. Hydrogen peroxide and TPO help to oxidize iodide to form iodine.

If there is a deficiency in iodine, which is common when ingesting the RDA for iodine, there will not be enough substrate (i.e., iodine) to produce iodinated lipids. As can be seen from [Figure 10](#), the lack of  $\delta$ -iodolactone and other iodinated lipids results in a loss of the 'brake' in the pathway to oxidize iodide. This may result in a temporary production of too much hydrogen peroxide. This excess hydrogen peroxide can damage the enzyme TPO.

### What Happens If TPO Is Damaged? Autoimmune Thyroid Illness

The body's response to TPO damage is to produce antibodies against TPO or anti-TPO antibodies. A diagnosis of Hashimoto's disease requires the presence of anti-TPO antibodies. As the damage worsens, surrounding proteins can also be damaged such as thyroglobulin. Damaged thyroglobulin will result in the body producing antibodies against thyroglobulin—anti-thyroglobulin antibodies.

In most cases of Hashimoto's disease, there are antibodies to both TPO and thyroglobulin present. Although Graves' disease may also possess these same antibodies, antibody production is not necessary to make the diagnosis of Graves' disease. However, my clinical experience has shown that the treatment for both Hashimoto's and Graves' disease can follow a similar course with similar positive outcomes.

## EARLY AND LATE STAGES OF AUTOIMMUNE THYROID DISORDERS

It is well known that patients with autoimmune thyroid disorders can fluctuate symptomatically between overactive thyroid symptoms (hyperthyroidism) and underactive thyroid symptoms (hypothyroidism). These patients can also suffer from a combination of hypo- and hyper-thyroid symptoms. For those struggling with autoimmune thyroid disorders, it can be an intolerable situation.

### Early Stages Autoimmune Thyroid Disorders

As previously explained, the early onset of the illness seems to be fueled by too much hydrogen peroxide damaging TPO and causing oxidative damage. As the illness progresses, thyroid hormone production can become unbalanced. Thyroid hormone is integral to stimulating the mitochondria to produce energy or ATP. If the mitochondria are not producing enough energy molecules, fatigue will set in. This fatigue can be unrelenting. Patients with this type of fatigue cannot exercise, as exercise will worsen their fatigue. These same patients will also complain of brain fog, as well as muscle aches and pains.

### Late Stages Autoimmune Thyroid Disorders

When the mitochondria are producing adequate energy molecules, we have enough energy to do as we please. When the illness has progressed and energy levels have declined, the system may be 'burning itself out' due to excessive oxidative damage. It is almost as if an oxidative storm has overwhelmed the energy producing cells of the body. Now, the mitochondria are not producing ATP (energy) in amounts necessary for health. So what can you do?

As shown in [Figure 10](#), providing enough iodine to produce iodo-lipids (e.g.,  $\delta$ -iodolactone) is a start. Next, it becomes necessary to stimulate the NADPH oxidase pathway. Remember, this pathway is integral to energy production. How do you increase the production of ATP in the mitochondria? You can provide the correct co-factors in this pathway to increase the production of ATP. Vitamins B2 (riboflavin) and B3 (niacin) are cofactors in the NADPH oxidase pathway and their use can help stimulate the mitochondria to produce more energy as well as provide the thyroid cells with enough  $H_2O_2$  to properly oxidize iodide.

The initial treatment in either early or late stage autoimmune thyroid disorders is to correct iodine deficiency. Concurrently, a

complete nutritional program, which includes the use of vitamins B2 and B3, vitamin C, magnesium, and unrefined salt, can be instituted to correct mitochondrial dysfunction, oxidant stress and tissue damage as described in the next section.

*I diagnosed my nurse Angela with Hashimoto's disease two years ago. Angela's complaints included fatigue, difficulty concentrating, and a general sense of not feeling well. "I am only 23 years old, I can't imagine what I will feel like when I am 50," she said. Angela was treated with iodine (50mg/day) and a complete nutritional program including vitamins and minerals. Angela did feel somewhat better (approximately 30%) but was not satisfied. When she walked into my office one day, she saw a bottle of 'ATP Co-Factors®', ([www.Optimox.com](http://www.Optimox.com)), which contains 100mg of B2 and 500mg of B3. She asked me what this bottle was for and I told her that this therapy has been a big help for Hashimoto's, Grave's disease, fibromyalgia, and chronic fatigue suffering patients. She said, "I have Hashimoto's, how come I am not on it?" I did not want to tell her that I forgot to tell her to take it, so I sheepishly told her that the next bottle was for her. Angela took one pill (100mg of B2 and 500mg of B3) and felt her energy improve within two hours. "I have taken so many supplements without having an effect, either positive or negative. This (ATP Co-Factors) was the greatest. I feel like I have woken up," she stated. Angela continues to take the supplement and continues to feel well. Update on Angela's case: Angela is still taking B2 and B3 along with iodine and continues to do well. "My antibodies are gone and I feel better than I have ever felt. I feel healthy now," she said.*

### How to Treat Autoimmune Thyroid Disorders

#### 1. Ingest enough iodine in order to provide adequate substrate to iodinate lipids.

The first step to treating autoimmune thyroid disorders is to assess iodine status. Iodine levels can be measured by checking blood, urine, and/or saliva. I routinely check every new patient in my office for their iodine levels primarily by measuring urinary levels. Either a spot urine or 24-hour loading test for iodine can be performed. For more information on testing, please refer to the Appendix.

If iodine levels are low, I recommend taking enough iodine to ensure that there will be enough substrate to organify (iodinate) lipids. As previously mentioned, it is impossible to achieve this with the RDA for iodine. My clinical experience has shown that most people need from 12-50mg/day of a combination of iodine and iodide. Lugol's solution or tableted Lugol's solution have both proven effective. More information on where to purchase iodine can be found in the Appendix. However, I suggest working with a health care provider knowledgeable in how to dose iodine in order to get the best results.

#### 2. Take Vitamins B2 and B3 in amounts necessary to stimulate the NADPH system to produce adequate amounts of H<sub>2</sub>O<sub>2</sub>.

The amounts of vitamins B2 and B3 must be sufficient to overcome deficiencies in the system. Dr. G. Abraham's research has shown that using 100mg of vitamin B2 (riboflavin) and 500mg of vitamin B3 (niacinamide) twice per day will help to stimulate ATP production and provide adequate H<sub>2</sub>O<sub>2</sub> for oxidation of iodide.

#### 3. Correct oxidant stress in the thyroid gland and the mitochondria with antioxidants.

I have used higher-dosed vitamin C in my practice for years with excellent results. My clinical experience has shown that larger doses of vitamin C are needed when one is suffering an exacerbation of any illness. Generally, between 3-10,000 mg/day of vitamin C provides the antioxidant protection necessary to overcome oxidative damage for most patients. Some people may require more. If the illness is severe, intravenous vitamin C can be very helpful. The only major side effect of vitamin C is diarrhea, which can easily be rectified by reducing the dose.

#### 4. Ensure adequate magnesium levels.

At the present time, my research has shown that magnesium deficiency is widespread. Magnesium levels can be ascertained by a red blood cell magnesium test. Magnesium acts as an antagonist to excess intracellular calcium levels which can fuel the oxidative pathways as shown in [Figure 10](#).

#### 5. Minimize oxidative stress in the body.

There are many ways to minimize oxidative stress in the body. Two of the most important ways are to drink adequate amounts of pure water and to eat a healthy diet. Drinking adequate amounts of water keeps the body hydrated. [Table 5](#) (next page) shows you how to calculate your water intake. Furthermore, eat a healthy diet that supplies the proper nutrients for your body. For information on eating a healthy diet, I refer the reader to my book, [The Guide to Healthy Eating](#).

Ensuring an adequate intake of unrefined salt in the body is also essential to minimize oxidative stress. More information on salt can be found in my book, [Salt Your Way to Health](#). Finally, reduce stress in your daily life and make sure you get the rest that you need.

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**Table 5: How to Calculate Your Water Intake**

1. **Take your weight in pounds**

**2. Divide by 2**

**3. The calculated number is the amount of water you should ingest in ounces per day**

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### **FINAL THOUGHTS**

My research and my clinical experience have been clear: the RDA dose for iodine is inadequate to prevent cancer. In fact, I believe that lowered iodine levels will provide fertile ground for cancer to begin in many different hormonally sensitive tissues including the thyroid, breasts, ovaries, uterus, and prostate gland. Optimal iodine supplementation varies in each individual; however, average doses to achieve the best effects (including cancer prevention) occur with daily doses ranging from 12-50mg/day for the vast majority of adults.

A diagnosis of an autoimmune thyroid disorder does not have to be a prescription for life-long suffering. In fact, following the principles outlined in this chapter has proven effective for many of my patients in helping them overcome an autoimmune thyroid disorder.

An autoimmune thyroid disorder (or any autoimmune disorder) is an example of excess oxidative stress in the body. Remember, oxidative stress in the body is similar to a fire burning. You can put out this fire by providing the body with what it needs: adequate intake of water, unrefined salt, and healthy food full of nutrients. Finally, it is important to reduce your stress levels. To achieve the best results, you should find a health care practitioner who can help guide you as well as monitor your symptoms. The best results will be achieved with a comprehensive holistic approach.

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<sup>2</sup> Kohrle, J., et al. Selenium, the thyroid, and the endocrine system. *Endocrine Reviews.* 26(7):944-84

<sup>3</sup> Eur. J. of Endocrin. 132. 735-43. 1995

<sup>4</sup> Horm. Metab. Res. 26. 465-69. 1994

<sup>5</sup> Rabinovitz, JL. Identification by nuclear magnetic resonance of iodinated lipids in the dog thyroid. *Biochem and Biophys Res. Com.* 1976; 68:1161-8

<sup>6</sup> Bachi, N. Thyroid cell injury is an initial event in the induction of autoimmune thyroiditis by iodine in obese strain chickens. *Endocrinology.* 1995; 136:5054-60

<sup>7</sup> Krawiec, L. The inhibition of PB125I formation of calf thyroid caused by 14-iodo-15-hydroxy-eicosatrienoic acid is due to decreased H<sub>2</sub>O<sub>2</sub> availability. *Horm. Metab. Res.* 1988;20:86-90

<sup>8</sup> Pisarev, MA. Thyroid autoregulation. Inhibition of goiter growth and of cyclic AMP formation in rat thyroid by iodinated derivatives of arachidonic acid. *J. Endocrin. Invest.* 1988; 11:669-74

<sup>9</sup> Abraham, G. Evidence of Defective Cellular Oxidation and Organification of Iodide in a Female with Fibromyalgia and Chronic Fatigue. *Original Internist.* June, 2007.

<sup>10</sup> Abraham, GE, and Flechas, JD. Management of fibromyalgia rationale for the use of magnesium and malic acid. *Journal of Nutr. Med.* 1992;3, 49-59

<sup>11</sup> Ohayon, R. Inhibition of thyroid NADPH-oxidase by 2-iodohexadecanal in a cell-free system. *Molec. And Cell. Endocr.* 1994; 99:133-41

## Chapter 6

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### Iodine and Autoimmune Thyroid Disorders

## CHAPTER 6: IODINE AND AUTOIMMUNE THYROID DISEASE

Graves' disease is an autoimmune illness whereby the thyroid gland is attacked by the body's production of antibodies. This causes an inflammation and swelling of the thyroid gland. Hyperthyroidism—an overactive metabolic state—is common in Graves' disease. However, the end-stage of Graves' disease often results in a hypothyroid picture.

Graves' disease occurs in 0.25-1% of the population and the number of individuals diagnosed with Graves' disease is increasing. Graves' is more common in females and usually occurs in middle age. In conventional medicine, there is no known cause of Graves' disease. Some causative factors reported in the literature include a genetic predisposition, infections, and stress.

Hashimoto's disease is also an autoimmune illness where the body produces antithyroid peroxidase antibodies (anti-TPO) that cause an inflammation of the thyroid gland. Goiter is a common occurrence with Hashimoto's disease. Both hyperthyroidism and hypothyroidism can be associated with Hashimoto's disease. Frequently, hypothyroidism is the end result of long-standing Hashimoto's disease. In conventional medicine, there is no known cause of Hashimoto's disease. However, I have identified two major causes of both Graves' and Hashimoto's disease: iodine deficiency and gluten sensitivity. More about these causes later.

Hashimoto's disease is more prevalent than Graves' disease. The incidence of autoimmune thyroid disease is commonly reported to occur in 0.1-5% of the population. The incidence of Hashimoto's disease is also rising rapidly. However, I believe the incidence of autoimmune thyroid disorders is much higher than the reported numbers. Over the last twenty years, I have been checking every new patient for an autoimmune thyroid illness. My experience would lead me to believe that the incidence of autoimmune thyroid disorders is much higher—in the range of 15-20% of the population. Part of this estimate is also based on asking other doctors at my lectures around the country what their experience has been. Nearly 100% of these doctors have reported finding similar (or sometimes higher) percentages of patients suffering from autoimmune thyroid disorders. Needless to say, I feel that autoimmune thyroid disorders, particularly Hashimoto's disease, are increasing at epidemic rates.

### FALLING IODINE LEVELS = INCREASED INCIDENCE OF AUTOIMMUNE THYROID DISORDERS

Over the last 40 years, the rising incidence of Hashimoto's and Graves' disease correlates with falling iodine levels. I believe the increase in both Hashimoto's and Graves' disease, which are occurring at near epidemic rates, are due, in large part, to iodine deficiency.

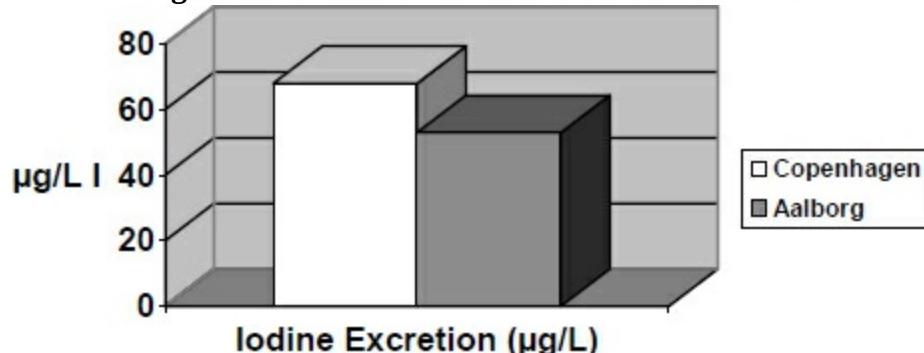
In the U.S., every few years the government surveys vitamin, mineral, and toxicity levels from a cross section of the U.S. population. It is reported as the National Health and Nutrition Examination Survey (NHANES). From 1970-2012 NHANES reports iodine levels have fallen by over 50%.<sup>1</sup>

Keep in mind that nearly all conventional doctors are under the misinformed opinion that iodine supplementation causes autoimmune thyroid diseases. I was taught that concept in medical school and I can assure you that it is still taught today. However, the research does not support this hypothesis as, over the last 40 years, iodine levels have significantly fallen while autoimmune thyroid disorders have markedly increased.

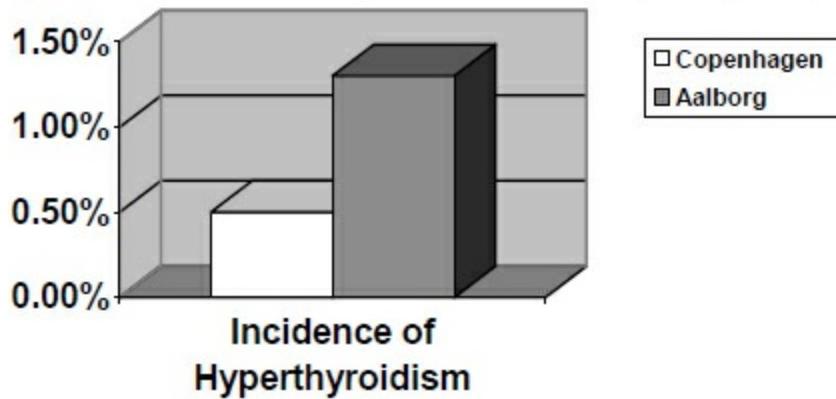
This concept of falling iodine levels resulting in a rising incidence of autoimmune thyroid disorders was illustrated in a European study. Researchers in Europe reported on the incidence of hyperthyroidism in two areas of Denmark (Aalborg and Copenhagen). The two areas were chosen because Aalborg had slightly lower iodine levels (53µg/L—measured on urinary excretion) as compared to Copenhagen (68µg/L). The results are shown in [Figures 11](#) and [12](#) (next page).

For comparison to the Denmark results, the average iodide excretion in the U.S. is 134µg/L.<sup>2</sup> In the U.S., nearly 60% of women of pregnancy age are deficient in iodine and 16.5% of women in their reproductive age have a remarkably low iodide excretion (below 50µg/L).<sup>3 4</sup> The World Health Organization (WHO) claims iodide excretion below 50µg/L is classified as moderate/severe iodide deficiency.<sup>5</sup>

**Figure 11: Iodine Excretion in Two Areas of Denmark**



**Figure 12: Iodine Deficiency and the Relationship of Hyperthyroidism**

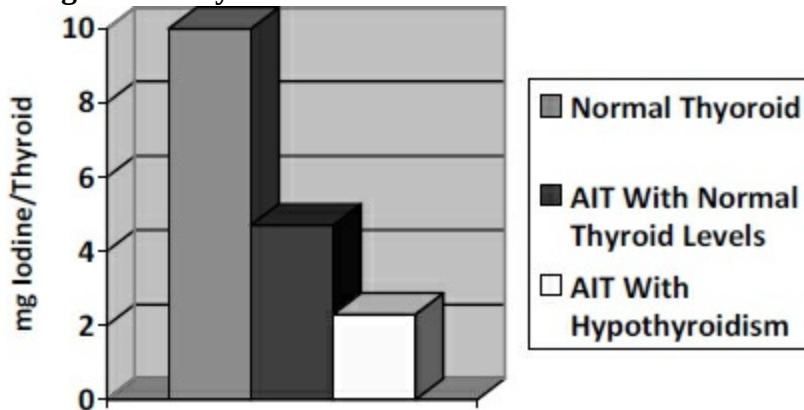


If iodine caused autoimmune thyroid problems, you would expect the rate of hyperthyroidism to decline as iodine levels fall. As illustrated in the European study above, that is just not the case. This study clearly illustrates that lowered iodine levels in Aalborg are associated with a 260% elevated incidence of autoimmune thyroid problems (hyperthyroidism) when compared to an area with slightly higher iodine levels—Copenhagen.<sup>6</sup>

#### X-RAY FLUORESCENCE SCANNING

If iodine was causing autoimmune thyroid (AIT) disorders, it is reasonable to expect that subjects with higher thyroid iodine levels, when compared to a group with lower thyroid iodine levels, would have an increased incidence of AIT disease. However, that is not what the research has found. The subjects who had AIT disorders had less iodine in their thyroid as compared to the subjects without AIT disorders.

**Figure 13: Thyroid Iodine Levels and Autoimmune Disorders**



X-ray fluorescence scanning measures the stable iodine content of the thyroid gland. A mean value of 10mg/thyroid was reported in a normal population. Fifty-six subjects with autoimmune thyroiditis had a mean value of 4.7mg iodine/thyroid—these subjects had normal thyroid levels. Thirteen subjects with autoimmune thyroiditis and hypothyroidism had a mean value of 2.3mg/thyroid. [Figure 13](#) (previous page) illustrates this study.<sup>7</sup>

#### DOES IODINE TREAT AUTOIMMUNE THYROID DISORDERS?

When I was in medical school, I was told that no one needed to supplement with iodine. I was also told that there was enough iodine in salt. Furthermore, it was implied that iodine supplementation caused autoimmune thyroid disorders including Graves' and Hashimoto's disease. Finally, I was taught that patients with AIT disorders need to avoid ingesting all sources of iodine. At that point in my medical career, I did not question these statements. However, years later, when I did question those ideas, I found the medical literature did not support those conclusions.

In fact, the use of iodine to treat AIT disorders, including Graves' disease, dates back hundreds of years. The first treatment of toxic goiter (an earlier term for Graves' disease) was reported in 1840 by Von Basedow and in 1854 by Sokes.<sup>8 9</sup> In 1863, the first double-blind cohort study was done with the use of iodine in a Graves' disease patient.<sup>10</sup> Dr. Armand Trousseau inadvertently treated a Graves' disease patient with iodine (75-100mg of Lugol's solution) instead of digitalis—which was the treatment of choice for Graves' disease at that time. Dr. Trousseau was surprised as his patient improved. Upon realizing his mistake, he stopped the iodine and resumed the digitalis treatment. The patient worsened. Since Dr. Trousseau and the patient were both unaware of what the patient was initially being treated with—iodine—this could be considered a “double-blind” study. Dr. Trousseau wrote, “In the course of October, 1853, I was consulted by a young married lady...She was suffering from subacute exophthalmic goiter {i.e., Graves' disease}.... I found her heart beating at the rate of 140-150 times in the minute...I wished to administer at the same time tincture of digitalis, but preoccupied with the idea that there would be some danger in giving

iodin (*sic*), I wrote iodin (*sic*) instead of digitalis, so that the patient took from 15-20 drops of tincture of iodin (*sic*) a day for a fortnight. When she came back to me her pulse was only 90. I found out my mistake, and I substituted tincture of digitalis for that of iodin (*sic*), but, after a fortnight, the pulse had again gone up to 150, so that I at once returned to the iodin (*sic*).” Keep in mind that Dr. Rousseau’s dose of iodine was 94-131mg of iodine per day.

In 1923, Dr. Henry Plummer was administering Lugol’s iodine pre-op (130-195mg) and post-op (62.5mg) to prevent thyroid storm during surgery of Graves’ disease. He reported that mortality declined from ‘high’ to zero with the use of iodine. [11](#) [12](#)

There are many other older research articles touting the benefits of using iodine in treating Graves’ disease. [13](#) [14](#) [15](#) As a treatment for hyperthyroidism, iodine fell out of favor with the advent of radioactive iodine treatment.

## CONVENTIONAL APPROACHES TO AUTOIMMUNE THYROID DISEASE: RADIOACTIVE IODINE

The conventional approach to treating autoimmune thyroid disorders revolves primarily around alleviating the symptoms of the autoimmune illness—mainly the symptoms of hyperthyroidism. This includes the use of antithyroid drugs (e.g., Propylthiouracil, Methimazole) that block the production of thyroid hormone. Other conventional treatments include surgery and radioactive iodine. Both of these destructive modalities work by reducing the volume of thyroid tissue. However, neither of these treatments addresses the underlying causative factor of these illnesses. In fact, in conventional medicine, there is rarely a search for an underlying causative factor. If you don’t search for an underlying causative factor, then how can you formulate an effective treatment plan?

Radioactive iodine is the preferred method in conventional medicine for treating autoimmune thyroid disorders. [16](#) In one of the most respected books on thyroid problems, radioactive iodine is reported as “effective, safe, and relatively inexpensive”[17](#). Let’s look at all three of these claims.

### IS RADIOACTIVE IODINE EFFECTIVE?

If the goal of treating an autoimmune thyroid disorder is to destroy the thyroid gland, then yes, radioactive iodine is effective. It is well known that iodine is taken up by the thyroid gland. By using a radioactive form of iodine ( $I^{131}$ ), the theory is that wherever the radioactive form of iodine binds, the radioactivity will destroy the surrounding cells. In the case of autoimmune thyroid disorders, the binding of the radioactive iodine to the thyroid gland will result in the destruction of thyroid tissue by the radioactive isotope.

If the cause of autoimmune thyroid disorders is too much thyroid tissue that needs to be destroyed, then the use of radioactive iodine could be considered effective. However, excess thyroid tissue is not the cause of autoimmune thyroid disorders; it is a consequence of the illness.

Radioactive iodine has never been considered a treatment which addresses the underlying cause of the illness. Radioactive iodine is solely a palliative treatment for the hyperthyroid symptoms of autoimmune thyroid problems. I believe there are more effective ways to treat autoimmune thyroid illnesses using natural items, which will be covered below.

### IS RADIOACTIVE IODINE SAFE?

Not only will radioactive iodine bind to the thyroid gland destroying thyroid cells, it will also bind to other sites in the body besides the thyroid gland. It was established in [Chapter 1](#) that iodine is present in all of the cells of the body. Radioactive iodine will be concentrated where iodine accumulates in the body, including the breasts in women. With breast cancer at epidemic rates—affecting one in seven women—I don’t believe a therapy should be used that may potentially increase this rate.

Researchers have reported a 400% increased incidence of death from thyroid cancer due to radioactive iodine. [18](#) Furthermore, a nine year study of 2,793 patients who received radioactive iodine found:[19](#)

1. 56% increase in mortality
2. 40% increased risk of stroke
3. 29% increased risk in mortality from cancer of any sort

To be fair, there are other articles pointing out no increased risk of illness after radioactive iodine therapy. However, common sense would dictate extreme caution with using radioactive iodine. I feel radioactive iodine therapy should be the last choice in any thyroid treatment program.

### RADIOACTIVE IODINE: IS IT INEXPENSIVE?

The cost of radioactive iodine is approximately \$3,000-\$5,000. Radioactive iodine is an expensive procedure that does not address the underlying cause of the illness. There are much better alternatives than radioactive iodine.

### SEARCHING FOR AN UNDERLYING CAUSE OF AUTOIMMUNE THYROID PROBLEMS

In order to formulate an effective, safe, and inexpensive treatment for autoimmune thyroid problems, one must first search for an underlying cause of the illness. As I discussed in my book, *Overcoming Thyroid Disorders, 3rd Edition*, the underlying cause of autoimmune thyroid disorders can be varied. This can include infections, toxicities, food allergies (e.g., gluten

intolerance), and nutritional imbalances. I believe that iodine deficiency is a causative risk factor in developing an autoimmune thyroid problem.

Tracy, 40-years-old, was diagnosed with Hashimoto's disease ten years ago after the birth of her son. Her TSH elevated to 150mIU/l (normal 0.2-4.7mIU/l) and she felt miserable. "I could not think clearly. I felt like my brain was in a fog. I would go to the store and not know why I was there. I was also extremely fatigued", she said. She had symptoms of hyperthyroid and hypothyroid problems. "Sometimes my heart would start racing for no apparent reason. I was irritable and moody. I couldn't work out because I felt so poorly," she claimed. Tracy was placed on Synthroid®, but felt no better. Although her laboratory tests improved and her TSH became normal, none of her symptoms improved. When I began treating Tracy, I found, through blood testing, that she was suffering from gluten sensitivity. I placed her on a gluten-free diet that alleviated many of her symptoms. She was also given nutritional supplements to correct many vitamin and mineral imbalances. Tracy's thyroid medication was changed to a more natural thyroid prescription—Nature-Throid® and she improved. "I felt much better. I could think more clearly. Most importantly, my energy came back," she said. When I investigated her iodine status, Tracy was found to be markedly iodine deficient. With the use of a combination of iodine/iodide, she further improved. Tracy claimed, "When I started taking iodine, my energy improved. I was sleeping better and dreaming better. I started to lift weights and build muscle which I haven't been able to do in a long time. I cannot believe the positive changes that I have seen with the iodine." Tracy's iodine levels have improved with using a combination of iodine/iodide and she continues to supplement today.

Marlene, a 45-year-old advertising executive, was diagnosed with Graves' disease one year ago. "I woke up one morning and my heart was beating very fast and I felt like I was on too much caffeine," she said. Marlene went to her physician who diagnosed her with Graves' disease. "I asked him what caused it, and he couldn't answer me. When he told me he wanted to treat me with radioactive iodine, I questioned him. I wasn't satisfied with his answers and I began to look at the alternatives," she said. Marlene was diagnosed with iodine deficiency (24% excretion on an iodine loading test—normal levels >90%). She was also found to have multiple nutritional deficiencies and elevated mercury levels. I treated Marlene with 50 mg of iodine (Iodoral®) per day as well as vitamins and minerals. In addition, a mercury detoxification plan was implemented. Furthermore, Marlene improved her diet, eliminating refined carbohydrates and drinking more water. After four weeks on this therapy, she noticed a dramatic improvement in her symptoms. "I was thrilled. All of the hyperthyroid symptoms resolved. I began to feel much better and even my energy level went up. People began asking me what I was doing, since they thought I looked so much better," she said. Marlene's case is not unique. Graves' disease can be treated effectively with a comprehensive holistic program.

My initial study on the iodine status of 24 patients (see [Chapter 2](#)) showed that 92% of those with Hashimoto's and Graves' disease also had iodine deficiency. Nearly every one of these patients had dramatic improvements in their symptoms with the use of a combination of iodine/iodide to replace the body's deficit. Rarely do I see a negative side effect from the use of iodine and side effects are easily rectified with adjusting the dosage. Keep in mind I am using iodine as part of a holistic treatment regimen that includes unrefined salt.

As mentioned previously, inorganic, non-radioactive iodine (such as Lugol's or tableted Lugol's) has been used to treat autoimmune thyroid problems for over 100 years. There are numerous reports in the literature citing the beneficial effects of iodine. In fact, iodine has been shown to reduce the hyperplasia and hypervascularity characteristic of Graves' disease.<sup>20</sup> In cases of hyperthyroidism, milligram doses of iodine/iodide were used effectively prior to thyroid surgery to decrease thyroid hormone blood levels and prevent thyroid storm—a complication of thyroid surgery.

There is a concern that the use of iodine in an autoimmune thyroid patient can exacerbate the symptoms of thyroid toxicosis. Sometimes this claim is made when the TSH (thyroid stimulating hormone) test elevates shortly after starting iodine therapy. As previously mentioned, after beginning iodine therapy in an iodine-deficient patient, it is expected that the TSH level will elevate. How can I make that statement? Understanding the biochemistry and physiology of the thyroid gland allows me to make that statement. The laboratory reference range for TSH is from 0.4-4.5mIU/L. An elevated TSH—in the range of 5-20mIU/L—with normal thyroid hormone, T4 and T3, along with a normal physical exam and history does not indicate a hypothyroid condition. Rather, it is a normal and expected response from the body to iodine supplementation. In the majority of patients, the TSH level may remain elevated for three to six months, before lowering into the reference range. The lowering of TSH indicates the body's iodine stores are increasing. More information about this mechanism can be found in the next chapter.

## FINAL THOUGHTS

I believe all individuals with a thyroid problem should have their iodine levels checked. If iodine levels are suboptimal, iodine replacement with the correct form of iodine should be instituted. However, it is important to make sure that the patient does not have an autonomous functioning thyroid nodule. Luckily, this condition is rare.

My experience has clearly shown that, for the vast majority of patients, the appropriate use of iodine in treating thyroid disorders, from hypothyroidism to Graves' and Hashimoto's disease, is not only safe, but effective and inexpensive. This is a holistic way to search for and treat an underlying cause of thyroid problems with a safe and natural agent. But, most importantly,

people improve their condition without experiencing any serious adverse effects.

My clinical experience has shown that when iodine is added to a hypothyroid patient's regimen, it may become necessary to adjust their thyroid dosage. Approximately one-third of patients being treated for hypothyroidism will need to lower their dose of thyroid hormone when an iodine-deficient disorder is corrected. The other two-thirds of the people taking thyroid hormone can usually maintain their dosage. Also, patients with Graves' and Hashimoto's disease may have to adjust their thyroid medications.

Iodine replacement is not the only therapy for thyroid illness. Nutritional supplementation, detoxification, drinking adequate amounts of water and dietary changes can also improve these conditions. For more information on a comprehensive holistic plan to treat thyroid disorders, I refer the reader to my book, ***Overcoming Thyroid Disorders, 3rd Edition***.

<sup>1</sup> Second National Report on Biochemical Indicators of Diet and Nutrition in the U.S. Population.

[http://www.cdc.gov/nutritionreport/pdf/Nutrition\\_Book\\_complete508\\_final.pdf#zoom=100](http://www.cdc.gov/nutritionreport/pdf/Nutrition_Book_complete508_final.pdf#zoom=100). Accessed 7.4.13

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<sup>3</sup> Thyroid. Vol. 21 N. 4. 2011

<sup>4</sup> Hollowell et al., J Clin Endocrinol Metab 83:3401-3408, 1998

<sup>5</sup> WHO. Assessment of iodine deficiency disorders and monitoring their elimination, 2nd Edition. 2001.

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<sup>17</sup> Cooper, D. In Werner and Ingbar's The Thyroid. 2000. Lippincott, Williams and Wilkins.

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## Chapter 7

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### *The Selenium/Iodine Connection*

## **Chapter 7: The Selenium/Iodine Connection**

Selenium is a trace element that is essential for health. It cannot be manufactured in our bodies; therefore, it must be found in our diets or taken as a supplement. Adequate selenium levels are necessary for regulating thyroid function and iodine metabolism. Small (microgram) amounts of selenium are necessary for maintaining optimal levels.

### **What Foods Provide Selenium?**

Plant foods are the world's major dietary source of selenium. The plant-based content of selenium is dependent on the selenium found in the soil where the plants are grown. Selenium can also be found in meat and seafood. Nuts can also contain selenium, with Brazil nuts containing the largest amount (544 $\mu$ g/ounce). In the U.S., meats and breads are common sources of selenium.<sup>1</sup> The content of selenium found in common foods is listed in [Table 6](#).

**Table 6: Content of Selenium in Common Food**

Food	$\mu$ g	Percent DV
Brazil Nuts (1 ounce)	544	780
Tuna (3 ounces)	63	95
Beef, cooked 3.5 ounces	35	50
Cod, cooked 3 ounces	32	45
Turkey, 3.5 ounces	32	45
Bread, whole wheat 1 slice	10	15
Bread, enriched, white 1 slice	4	6

### **Recommended Daily Allowance (RDA) For Selenium**

The RDA for selenium is 55 $\mu$ g/day in adults which is based on the dietary selenium required to maximize the activity of the antioxidant enzyme glutathione peroxidase.<sup>2 3</sup>

### **Selenium Deficiency**

In the U.S., it is estimated that most adults ingest about 100 $\mu$ g/day of selenium, which is above the RDA.<sup>4</sup> Although the intake of selenium may appear adequate to maintain glutathione peroxidase activity, the RDA does not take into account the toxic load that may be affecting the glutathione activity in the body.

The more toxic agents, such as pesticides, mercury, chlorine, and bromine that we come in contact with, the more glutathione peroxidase will be needed to help to detoxify these agents. Selenium deficiency can be the rate-limiting step in the body's production of glutathione.

Studies have found selenium depletion in individuals with gastrointestinal disorders such as Crohn's disease or those with surgical removal of part of the intestines or stomach.<sup>5 6 7</sup> Selenium deficiency has been linked to an increased risk of:

- Death from cancer of the lung, colorectal, and prostate<sup>8 9 10 11</sup>
- Arthritis<sup>12 13</sup>
- Heart disease and cardiomyopathy<sup>14</sup>
- HIV disease progression

The exact mechanism of selenium deficiency causing the above illnesses has not been elucidated. One hypothesis is that selenium acts as an antioxidant (in part, through glutathione peroxidase) and can counter the oxidant damage caused by various

illnesses.

### Selenium Toxicity

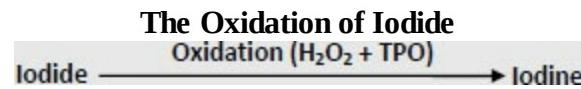
Selenium has a narrow margin of safety. Unlike vitamin C, where large doses are rarely harmful, larger doses of selenium can cause adverse effects. Selenosis is a condition of high blood levels of selenium ( $>100\mu\text{g}/\text{dl}$ ). Symptoms of selenosis include: hair loss, fatigue, irritability, garlic breath odor, and mild nerve damage.<sup>15</sup> The Institute of Medicine of the National Academy of Sciences has set the upper intake level of selenium at  $400\mu\text{g}/\text{day}$  for adults to prevent the risk of selenosis.<sup>16</sup> My 21 years of practicing nutritional medicine has shown  $100\text{-}400\mu\text{g}/\text{day}$  of selenium to be a safe range. These doses have not caused selenosis in any patients.

### Selenium and Iodine

Selenium is a required component of at least 11 enzymes. Without selenium, these enzymes would be nonfunctional. Life itself is not possible without selenium and the selenoenzymes. This chapter will focus on two of the selenoenzymes: glutathione peroxidase and iodothyronine deiodinase.

#### Glutathione Peroxidase

Four separate glutathione peroxidase enzymes have been identified. Each of these enzymes has antioxidant capabilities and protects the body from oxidant damage. Recall from [Chapter 5](#), the oxidation of iodide (shown below).

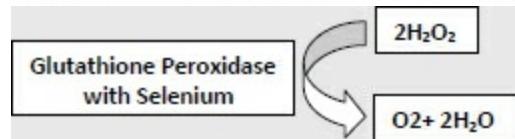


The oxidation reaction is catalyzed by the interaction of  $\text{H}_2\text{O}_2$  and thyroperoxidase (TPO). Furthermore, we established that too much hydrogen peroxide could damage TPO and cause Hashimoto's disease.

One of the controlling features of this reaction is the enzyme glutathione peroxidase. Glutathione peroxidase can react with  $\text{H}_2\text{O}_2$  to reduce hydrogen peroxide to water. [Figure 14](#) illustrates this principle.

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**FIGURE 14: Glutathione Peroxidase**



If there is not adequate selenium available, there will be insufficient glutathione peroxidase to reduce and neutralize excess  $\text{H}_2\text{O}_2$ . Excess hydrogen peroxide can cause the oxidative damage to TPO and initiate the start of autoimmune thyroiditis. Animal studies have agreed with this model.<sup>17</sup>

#### IODOTHYRONINE DEIODINASES

Iodothyronine deiodinases are enzymes that are responsible for activating and deactivating thyroid hormone. These agents work by removing an iodine molecule. For example, the thyroid gland releases a large amount of the inactive form of thyroid hormone T4 into the circulation. T4 has to be converted to T3 to become the active form of thyroid hormone. Iodothyronine deiodinase, a selenium-containing enzyme, is responsible for this conversion as shown in [Figure 15](#). Selenium deficiency has been shown to decrease deiodinase protein and activity.<sup>18</sup>

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**FIGURE 15: Iodothyronine Deiodinase**



Selenium levels can be checked through the hair, serum, or nail clippings. I have found hair selenium levels very reliable. In order to achieve the best results, I suggest working with a health care practitioner knowledgeable about natural therapies. Supplementing with selenium in doses of 100-200 $\mu$ g/day has proven safe and effective at correcting selenium deficiencies.

#### FINAL THOUGHTS

Selenium is a very important trace element. Adequate selenium levels are necessary to maintain optimal thyroid function. If selenium is deficient, inadequate glutathione peroxidase will be produced. This can set the stage for autoimmune thyroid disorders to begin as the thyroid gland can be damaged by H<sub>2</sub>O<sub>2</sub>. Adequate selenium levels can ensure optimal glutathione peroxidase production and help protect the thyroid gland from oxidative damage.

Selenium is also important for activating thyroid hormone (via iodothyronine deiodinase, [Figure 15](#)). I have treated many patients with hypothyroid symptoms that resolve when the underlying nutritional deficiencies, such as selenium deficiency, are rectified.

If you have side effects with iodine therapy, I suggest looking at selenium deficiency as a possible cause. If your selenium levels are low, supplementing with selenium may correct the problem.

<sup>1</sup> NIH Office of Dietary Supplements. [www.nih.gov/factsheets/selenium.asp](http://www.nih.gov/factsheets/selenium.asp). Accessed 8.19.07

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## Chapter 8

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**Iodine, Breast Cancer, and Fibrocystic Breast Disease**

## **CHAPTER 8: IODINE, BREAST CANCER AND FIBROCYSTIC BREAST DISEASE**

*Joan, a 60-year-old English teacher, was diagnosed with breast cancer in 1989. She refused conventional therapy and looked for other options. She found a holistic doctor who recommended that she take 2mg/day of iodine in addition to a regimen of vitamins and minerals. She was also diagnosed with hypothyroidism and treated with thyroid hormone. Over the next ten years, she felt well and continued to teach. The tumor metastasized in early 2005. Joan's tumor markers also increased and she felt very fatigued. She lost 25 pounds of weight by July 2005. "I felt like I was dying," she said. After she read of Dr. Abraham's research on iodine, she found a doctor to prescribe iodine for her. She increased the iodine dose from 2mg/day to 50-62.5mg/day using a tablet form of Lugol's (Iodoral®). As she increased the iodine, she was able to stop the thyroid hormone. After six weeks of taking the higher iodine dose, Joan had a PET scan. The PET scan showed that all of the existing tumors were disintegrating. The central areas of the tumors were disintegrating after just 42 days of taking a higher dose of iodine. "I am so grateful for this information as it is surely saving my life," Joan claimed.*

Joan's case is not unique. Iodine can cause tumors to shrink and necrose from the center. I have observed similar results with nodules and cysts in the thyroid, ovaries, and uterus after instituting orthoiodosupplementation.

This chapter will explore the relationship between iodine deficiency and disorders of the breast, including fibrocystic breast disease and breast cancer as well as other cancers. For over 60 years, it has been known that iodine concentrates in and is secreted by the mammary glands. The breasts are one of the body's main storage and utilization sites for iodine. An adequate iodine level is necessary for the development and maintenance of normal breast architecture. Milk from lactating breasts contains four times more of the ingested iodine than the amount taken up by the thyroid gland.<sup>1</sup>

Animal studies have shown conclusively that an iodine deficient state can alter the structure and function of the breasts. After my own research and study, I concur with several investigators that iodine deficiency is a causative factor in breast cancer and fibrocystic breast disease. I believe it is essential that women have their iodine levels tested, and if it is shown there is an iodine deficiency, iodine supplementation should be initiated.

The breasts are one of the body's main storage sites for iodine in the body. In an iodine-deficient state, the thyroid gland and the breasts will compete for what little iodine is available. Therefore, this will leave the thyroid gland and the breasts iodine depleted and can set the stage for illnesses such as goiter, hypothyroidism, autoimmune thyroid illness, and breast illnesses including cancer and cystic breast disease. In addition, other glandular tissues, such as the ovaries which contain the second highest concentration of iodine in the body, will also be depleted in an iodine-deficient state.

### **IODINE: THE ANTICANCER AGENT**

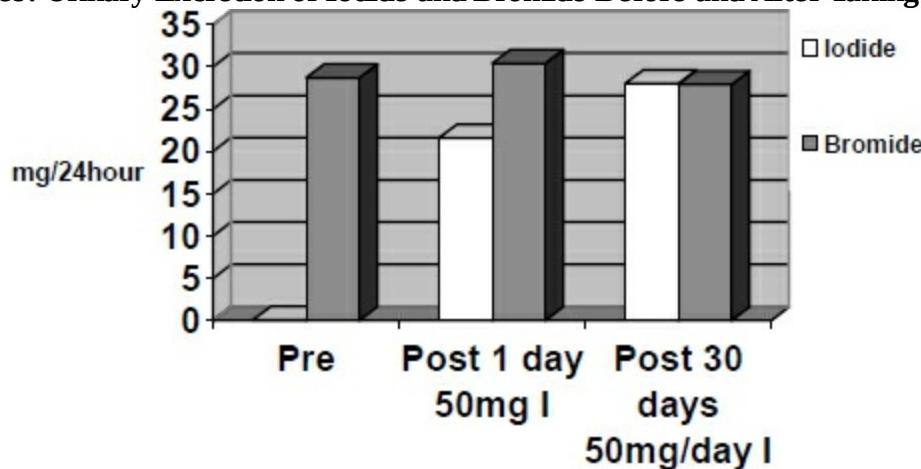
Iodine has many anticancer properties. Cancer cells, unlike normal cells, do not have a normal life cycle; they just keep dividing over and over. Normal cells have a life cycle, and when they eventually die, they are replaced with a new cell. This process of timed cellular death is known as apoptosis. Iodine has been shown to induce apoptosis (death) in breast and thyroid cancer cells. However, this apoptotic effect will be negated if a goitrogen is given.<sup>2</sup> More about apoptosis is found in [Chapter 5](#).

How does iodine provide this apoptotic effect? One mechanism may be the iodination of lipids. Lipids are fats that make up our cell membranes throughout our body. Iodine can become incorporated into lipids (fats) inside the cell. These substances are known as iodo-lipids. When iodine is incorporated into the lipids, it helps to stabilize them and also helps each cell to maintain a normal life cycle (see [Chapter 5](#) for more information on iodo-lipids).

Iodine has been shown to be a potent antioxidant even more effective than vitamin E, phosphatidyl choline, and vitamin C.<sup>3 4</sup> As with vitamin C, iodine can function as both an antioxidant as well as an oxidant in the body. This dual effect makes it a strong anticancer agent. One of the best signs of health in the body is a balance between antioxidants and oxidants. Items like iodine and vitamin C can help maintain that balance, and therefore, are some of the most powerful anti-cancer agents known.

*Delores, an active 73-year-old woman, was diagnosed with breast cancer in 2003. She refused conventional therapy and wanted an alternative treatment. "Why would I do chemotherapy and radiation when the doctors told me that these treatments may not help? They could not give me good statistics that these treatments would prolong my life. When I asked them to help me find the cause of this illness, they just had a blank stare in their eyes. When I read about the relationship between iodine and breast cancer, I asked my doctor about it and he said, "There is enough iodine in salt". When I saw Delores, I measured her iodine and bromide levels as part of a study I was conducting on breast cancer patients. Her results are summarized below.*

## Delores: Urinary Excretion of Iodide and Bromide Before and After Taking Iodine



Delores' initial results show that she was excreting large amounts of the toxic halide bromide at the same time that her body was very deficient in iodine. After taking 50mg of iodine/iodide (Iodoral®), her bromide excretion increased and still was elevated after 30 days of taking iodine. At the same time that her body was absorbing iodine, it was also excreting the toxic halide bromine. Delores was treated with a holistic treatment program that included vitamins, minerals, and bioidentical hormones in addition to other natural items to support her detoxification pathways. This holistic regimen included the use of Celtic Sea Salt® and iodine. The salt and iodine were utilized to help the body detoxify bromide. After three months on this program, Delores felt significantly improved. "My energy level was so much better. I can now do ten times what I could do before," she said.

Delores had a repeat ultrasound 18 months after starting the iodine-based therapy and the radiologist reported on the ultrasound, "It would seem, therefore, that these malignancies have diminished considerably in size. The breast cancer appears considerably diminished when compared to previous ultrasound. Interval improvement is definitely seen."

Update on Delores' condition: It has now been nearly two years and Delores has been taking iodine as well as the nutrient therapies described. Delores just had a follow-up mammogram and ultrasound which failed to show any abnormality. Both were read by the radiologist as normal and she was recommended to have yearly mammogram screening.

New 5<sup>th</sup> Edition Update on Delores: Delores is still doing well with no signs of breast cancer. I see her twice per year for routine follow-up. At our last visit she reported that she was feeling well. "I am glad I followed a natural program. Who knows what all those toxins would have done to me," she said.

There is a wealth of research showing the connection between iodine deficiency and breast cancer. We should be searching for underlying cause(s) of cancer and formulating a treatment program tailored to addressing the underlying cause(s). The "war" on breast cancer began 35 years ago. The progress in treating breast cancer with chemotherapy, surgery, and radiation has been dismal. Survival rates for breast cancer victims are virtually unchanged over the last 70 years<sup>6</sup>, even with the use of mammograms, surgery, chemotherapy, and radiation.

Iodine deficiency as well as other toxicities (especially the toxic halides bromine and fluoride) must be investigated. Perhaps rectifying iodine deficiency will be the missing piece of the puzzle to solving the riddle of breast cancer. Delores' results have been repeated over and over in my practice. I believe all women need to be evaluated for their iodine status before they reach the stage of breast cancer.

### ESTROGENS AND IODINE: THE CONNECTION

This section will deal with the relationship between iodine and estrogens. Estrogens are a class of steroid hormones produced and secreted in both men and women. In men, most of the estrogen is produced in the adrenal glands, fat tissue, and liver. The amount of estrogen in men is ten times lower than it is in women.

In women, estrogens control female sexual development including promoting the growth and function of the female sexual organs such as the ovaries, uterus, and breasts. The ovaries produce most of the estrogen in women, with smaller amounts produced in the adrenal glands and the fat tissue.

### DIFFERENT FORMS OF ESTROGEN

There are three major types of estrogen produced in the female body: estrone (E1), estradiol (E2), and estriol (E3). Estriol is a much weaker estrogen than either estrone or estradiol. Research has shown that estriol may be able to prevent breast cancer in mice.<sup>7</sup> Furthermore, estriol is less stimulating to breast tissue than either estradiol or estrone and may have a protective effect for breast cancer. My colleague, Jonathan Wright, M.D., measured the estrogen levels in healthy twenty to forty-year-old women

and found that estriol was produced at much larger amounts than either estrone or estradiol.<sup>8</sup> Estrogen replacement therapy has been promoted to help women with menopausal symptoms, osteoporosis, and other illnesses. Common sense would argue that to achieve the greatest benefit from estrogen replacement therapy, we should try to mimic the body's own production of estrogen. In other words, we should use the same proportions of estrone, estradiol, and estriol normally produced in the healthy body. Estrogen production in the body can be monitored by measuring the amounts of estrone, estradiol, and estriol that are present in biological fluid. When there are imbalances in estrogen production, such as lowered amounts of estriol and larger amounts of estrone and estradiol, problems such as fibrocystic breasts, cancer, and weight gain may develop.

Dr. Wright has reported compelling data that iodine, in the form of Lugol's solution (iodine and iodide) can help maintain the correct balance of the three estrogens. Specifically, Dr. Wright has reported that Lugol's solution will help the body metabolize the estrogens to favor the safer form of estrogen—estriol. My experience has found the same results; the use of iodine helps to maintain a balanced estrogen ratio in favor of estriol.<sup>9</sup>

For women, a balance of estrogens is vitally important for numerous bodily functions including ensuring optimal function of the brain, breast development, and lubrication of the skin. In addition, estrogen balance helps to ensure strong bones and may help to prevent cardiovascular disease. Imbalances in estrogen production are associated with weight gain, mood swings, and disorders such as diabetes as well as cancer of the breast, ovary, and uterus. Estrogen balance is impossible to maintain when there is iodine deficiency present. For more information on the use of estrogens and other natural hormones, I refer the reader to my book, *The Miracle of Natural Hormones, 3rd Edition*.

### **IODINE ALTERS GENE EXPRESSION IN THE BREASTS**

Researchers have recently reported that the combination of iodine/iodide (e.g., Lugol's solution) has been shown to alter gene expression in estrogen-responsive breast cancer cells. They found that iodine down-regulated (lowered) several estrogen responsive genes. They also reported that iodine increased BRCA1 activity. BRCA1 is a gene that modulates estrogen activity in the breast. People with abnormalities in BRCA1 are at a markedly increased risk for breast cancer. Finally, the same researchers reported that iodine/iodide therapy "...could enhance the efficacy of Tamoxifen therapy...thus preventing or slowing the development of Tamoxifen resistance."<sup>10</sup>

This is a very important study showing that iodine can favorably influence the gene expression in breast cancer. Future research will undoubtedly build on this concept.

### **IODINE DEFICIENCY AND THE BREASTS**

Iodine deficiency has been shown to produce specific changes in the breast tissue of rats. Studies dating back nearly 40 years ago show that iodine deficiency in rats produces the exact precancerous changes seen in humans—dysplasia and hyperplasia.<sup>11</sup><sup>12</sup> Furthermore, with long-term iodine depletion, more atypical changes in rat breast tissue occur.<sup>13</sup> This is the precursor to breast cancer.

Dr. Bernard Eskin, one of the world's foremost researchers on iodine and the breast, writes, "In all these studies, termination of dietary iodine restriction...results in a variable modest return toward the normal {breast} structure."<sup>14</sup>

Dr. Eskin has studied the effects of estrogen and iodine in rats. He has found that rats need an adequate level of iodine in order for estrogen to perform its normal function in breast tissue.<sup>15</sup>

Researchers have demonstrated that rats given certain carcinogens will develop breast cancer. When iodine is given along with the carcinogens, tumor formation is blocked.<sup>16</sup><sup>17</sup> These studies would indicate that iodine has the ability to block cancer progression in the breast tissue.

It is known that the ovaries concentrate a large amount of iodine. After the thyroid, the ovaries have the second largest concentration of iodine in the body. Iodine deficiency produces changes in the ovarian production of estrogens as well as changes in the estrogen receptors of the breasts. In an iodine-deficient state, research has shown that ovarian estrogen production increases, while estrogen receptors in the breast increase their sensitivity to estrogens.<sup>18</sup><sup>19</sup> Both of these conditions will increase the risk of developing pathology of the breasts including breast cancer.

### **PUTTING IT ALL TOGETHER: ESTROGEN AND IODINE AND THE CONNECTION TO CANCER**

Iodine deficiency has many consequences. First, it causes estrogen production to increase. Iodine deficiency also leads to an increased sensitivity of breast tissue to estrogen. All of the above conditions will increase the chances of developing disease(s) of the breast including breast cancer. When you factor in our exposure to environmental estrogens, including xenoestrogens found in plastics, and pesticides, as well as meat and dairy products, it is no wonder that hormone-sensitive cancers like breast (as well as prostate, ovarian, and uterine) cancer have reached epidemic proportions. Research in animals has shown that the correction of iodine deficiency results in abnormal breast tissue changing back to normal breast tissue. My clinical experience has shown the same positive results occur with my human patients. This chapter will explore this concept in more detail.

### **FIBROCYSTIC BREAST DISEASE**

Fibrocystic breast disease is a condition whereby the breasts have cysts that are usually painful to touch. Up to two-thirds of American women suffer from fibrocystic breast disease. In fibrocystic breast disease, the texture of the cysts can vary from soft

to firm. Many times these cysts can change size and shape during the menstrual cycle, and they can cause discomfort premenstrually. Although fibrocystic breast disease is generally thought of as a benign condition, there are many physicians who feel that the abnormal breast architecture found in fibrocystic disease is a precursor for breast cancer, and this has been confirmed in various studies.<sup>20 21 22</sup>

Estrogens have been implicated as a causative factor for fibrocystic disease and breast cancer. In fact, one of the most common treatments in conventional medicine for fibrocystic disease is to use birth control pills to suppress the ovaries and lower the amount of circulating estrogen in the body.

As repeated hormonal cycles progress, oftentimes the fibrocystic changes in the breast will worsen. The breasts can become chronically inflamed and hardened. Many women suffer terribly with this illness.

Dietary factors can also worsen fibrocystic breast disease. Caffeine and foods that contain trans-fatty acids can exacerbate fibrocystic breast disease. Eliminating caffeine and eating foods rich in healthy fats, including essential fatty acids, will help alleviate many of the complaints of fibrocystic breast disease.

Also, vitamin and mineral supplementation can alleviate this condition. Both vitamin E and vitamin A have both been shown in studies to improve fibrocystic breasts.

Iodine has also been shown to be extremely effective in treating and preventing fibrocystic breasts.<sup>23</sup> In fact, iodine has been the most researched mineral in treating fibrocystic breast disease.

*MaryAnn, age 45, works as a nurse at a local hospital. MaryAnn suffered from fibrocystic breast disease for over 15 years. She said, "My breasts feel like two rocks. I can't do aerobics or exercise heavily because the bouncing causes tremendous pain." MaryAnn was going to a specialized cystic breast clinic at the University of Michigan. Frequently, she was having breast cysts drained, only to have them reappear a short time later. Dietary changes, including removing the caffeine did help somewhat. MaryAnn was so miserable she was contemplating a bilateral mastectomy. MaryAnn was found to be severely iodine deficient (iodine challenge test showed 27% excretion with normal levels >90%). She was treated with Iodoral® 50mg per day and within one month had a dramatic change in her condition. She called me on the phone and reported, "Dr. Brownstein, I was at the University of Michigan clinic yesterday and the doctor told me he thought my breasts weren't mine. The two rocks I had are now soft and normal feeling. All of the cysts are gone and all of the pain is gone. This has been a miracle for me. I can't believe one nutrient could have such a positive impact on my life."*

New 5<sup>th</sup> Edition update on MaryAnn: MaryAnn comes into my office twice per year for routine care. She recently reported, "I am feeling fabulous since I started taking iodine. My mammograms are now normal." MaryAnn has no signs of fibrocystic breast disease as long as she takes iodine.

Darlene, at age 39, suffered from fibrocystic breast disease for over five years. "Sometimes I am absolutely miserable. I cannot stand anything touching my breasts. It feels like there is a tourniquet around them," she said. Darlene's symptoms would get worse around her menses. She said, "My husband knows not to get within five feet of me. If I bump into anything, I feel like crying." Darlene was told to alter her diet and give up caffeine and chocolate, which did help some of her symptoms. "The change in the diet did help, but I was still miserable," she claimed. When I checked Darlene's iodine levels, her iodine-loading tests showed a 50% excretion (normal is 90%). After two weeks of supplementing with an iodine/iodide combination (Iodoral®), Darlene's condition rapidly improved. "I just woke up one morning and I wasn't in pain. I could not believe it. I feel like I have been given my life back," she said. In addition, the iodine significantly improved her energy and mood levels. Darlene says, "I can't believe how much better I feel."

MaryAnn and Darlene's cases are typical of many with fibrocystic breast disease. Usually, the improvement in fibrocystic symptoms occurs rapidly when there is an iodine-deficient state present.

## THYROID DISEASE, IODINE, AND CANCER

For well over 100 years, iodine deficiency has been associated with a swelling of the thyroid or goiter. Goiter has also been associated with cancers of the breast, stomach, esophagus, ovaries, and uterus.<sup>24 25 26</sup> My colleague, Jorge Flechas, M.D., reports a "definite increase in the incidence of breast cancer, stomach cancer, ovarian cancer, and thyroid cancer with the presence of iodine deficiency."<sup>27</sup> I have seen similar results in my practice.

## BREAST CANCER AND HYPOTHYROIDISM

Because breast cancer is occurring at epidemic rates, it is important to discuss this topic again. The relationship between hypothyroidism and breast cancer has been reported for over 100 years. In fact, the first reported connection between these two illnesses was mentioned in 1896. Although there has not been a consensus opinion on the relationship between breast cancer and hypothyroidism, many researchers feel there is a direct connection.

Researchers have found that hypothyroidism is much more common in women with breast cancer.<sup>28 29</sup> Other researchers have found that the use of thyroid hormones may cause a higher incidence of breast cancer.<sup>30</sup> Although there has been a great controversy in medicine on verifying the relationship between hypothyroidism and breast cancer, my experience has shown that

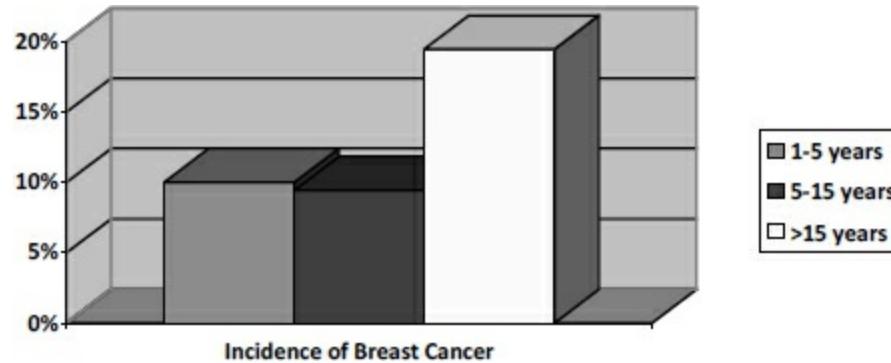
there is a connection.

It is known that hypothyroidism predisposes one to a poorly functioning immune system. This can set the stage for serious illnesses such as cancer. One would think that the treatment of hypothyroidism with thyroid hormone would improve the condition of breast cancer, since it should improve the functioning of the immune system. However, this has not been shown to be the case in some studies. In fact, some studies point to an exacerbation of breast cancer when thyroid hormones are used to treat a hypothyroid condition.

One study found that hypothyroid women who took thyroid hormone had a 50% increased risk of breast cancer.<sup>31</sup> Furthermore, as compared to women who were taking thyroid hormone for less than 15 years, the same researchers reported a 200% increased risk of breast cancer in women who were taking thyroid hormone for more than 15 years. The results of this study are illustrated in [Figure 16, page 168.](#)<sup>32</sup>

### WHY WOULD THE TREATMENT OF HYPOTHYROIDISM RESULT IN AN INCREASED RISK OF BREAST CANCER? THE IODINE CONNECTION

When hypothyroidism is present, the body is in a hypometabolic state. In other words, all bodily functions slowdown and the consequences of this state include cold extremities, dry skin, fatigue, brain fog and weight gain.



**Figure 16: Increased Risk of Breast Cancer the Longer Women Took Thyroid Hormone**

When thyroid hormone is ingested, it results in an increased metabolic state which reverses all of the above conditions.

ATP is the body's "high octane" energy source. Thyroid hormone utilizes ATP to increase the body's metabolic rate. This increased metabolism helps the body produce more heat, lose weight, overcome fatigue, etc. If thyroid hormone is given to an iodine-deficient patient, the increased metabolic rate due to thyroid hormone will actually increase the body's need for iodine as well as decreasing the ability of the cells of the body to concentrate iodine.

Iodine uptake by the cells is an energy dependent process which requires ATP. Thyroid hormones use the energy available for the synthesis of ATP to produce heat. This effect lowers the available ATP for cellular uptake of iodine by the target cells. If there are lowered ATP levels in the body, the target cells have a more difficult time concentrating iodine.

Finally, if a hypothyroid condition is treated with thyroid hormone and there is also iodine deficiency present, the use of thyroid hormone will exacerbate an iodine-deficient condition. In other words, if you treat with thyroid hormone without first correcting for iodine deficiency, you will increase the body's need for iodine and worsen the iodine-deficient problem that is already present.

The only logical explanation that ties the treatment of hypothyroidism with an increased risk of developing breast cancer would be the presence of an iodine deficiency.

In simpler terms, thyroid hormones introduced into the body will raise the body's need for iodine. The breasts, like the thyroid gland, have an advanced system for absorbing and storing iodine. When there is iodine deficiency, the breasts and the thyroid gland enlarge to compensate for that deficiency. In both cases, iodine deficiency induces hyperplasia, which is a precancerous lesion. This will set the stage for thyroid and breast diseases, including cancer of the thyroid gland and the breasts.

If iodine deficiency is present, the use of thyroid hormone supplementation without first correcting (or simultaneously correcting) the iodine deficit will exacerbate the body's deficit of iodine. The result of this can be an increase in disorders caused by iodine deficiency such as cancers of the breast and thyroid.

### THE BREASTS AND IODINE

The therapeutic use of iodine in treating breast cancer was first described in the medical literature in 1896.<sup>33</sup> There is a direct relationship between breast cancer (as well as goiter) and regions of the world where iodine deficiency is prevalent. Countries such as Japan and Iceland have higher intakes of iodine and lower rates of goiter and breast cancer. On the other hand, countries such as the United States, Mexico, and Thailand have lower iodine intake and higher incidences of both breast cancer and goiter.<sup>34</sup> Some countries such as Poland, Switzerland, Australia, and Russia have been found to have high rates of breast cancer

associated with localized pockets of iodine deficiency. In the United States, a correlation has been found between higher mortality rates from breast cancer and areas of iodine deficiency (e.g., Great Lakes region).<sup>35</sup>

Cathy, 49 years old, was diagnosed with breast cancer one year ago. She said, "I was devastated. I thought I took good care of myself and my life was shattered. When I asked the surgeon, 'How did I get it?' He answered, 'I don't know'. His only concern was doing surgery and getting me ready for chemotherapy. I was not satisfied with that." Cathy did elect to have a bilateral mastectomy and chemotherapy, but still searched for why this may have happened to her. When I examined Cathy, I found her to have a serum iodine level below the detection limits as well as having a very low iodine loading test—22% (normal > 90%). In treating her with iodine/iodide (Iodoral®), she noticed an immediate improvement in her overall health. "I was having fatigue and leg cramps. The fatigue was debilitating. I felt like an old woman," she said. Three weeks after starting the iodine, both conditions improved dramatically. "It was a miracle. The leg cramps and leg pains melted away but, more importantly, the fatigue left. My brain started functioning again, and I began to feel like my old self. Even my friends began asking me what I was taking, since I looked so much better," she said.

Iodine has been found to be necessary for the maintenance of normal breast tissue in both animals and humans.<sup>36 37 38 39</sup>

Iodine was found to have a suppressive effect on the development and the size of mammary tumors in rats.<sup>40</sup> This suppressive effect was enhanced with the use of progesterone. The enhancement of iodine uptake with progesterone has also been found in other tissue including the uterus and the ovary.<sup>41</sup> These studies prove that the optimal use of iodine is best undertaken as part of a comprehensive holistic treatment program, which emphasizes balancing the hormonal system as well as correcting nutrient deficits. For more information on bioidentical hormones, I refer the reader to my book, **The Miracle of Natural Hormones, 3rd Edition.**

### **THE BREASTS AND TOXIC HALIDES: IS THERE AN ASSOCIATION WITH BREAST CANCER?**

The halides are a group of elements that share a similar size and shape. Chapter 11 will cover this topic in much more detail. Fluoride, bromine, iodide, chloride, and astatide make up this family. Iodine and chloride are the only halides that have therapeutic effects in the body.

Bromide is a toxic element that has a chemical structure very similar to iodine. This similarity can cause bromine to bind to iodine receptors and possibly interfere with iodine transport in the body. Bromine is found in many food items such as bakery products, and some sodas, as well as many prescription items. In addition, bromine is found in many fire-retardant chemicals added to furniture, carpets, etc. Crops are sprayed with bromine as a fumigant for agriculture. When there is iodine deficiency present, bromine toxicity will be exacerbated.

Fluoride is put in the water supply, toothpaste, and many drinks as a preventive measure against dental caries. There is little evidence to support the idea that fluoride prevents cavities. Furthermore, there is much research that shows that fluoride (in the amounts ingested by drinking fluoridated water) can cause dental fluorosis, hip fractures, bone cancer, and other negative effects. Fluoride toxicity will be covered in more detail in Chapter 11.

I undertook a study in my office to look at the difference in iodine, fluoride, and bromine levels in eight women with breast cancer versus ten women without breast cancer. Please refer to Chapter 11 for a further discussion of this study and the results.

This study showed that all of the women tested--those with breast cancer as well as those without breast cancer--had low iodine levels. Those women with breast cancer were found to have much larger amounts of the toxic halides bromine and fluoride as compared to the women without breast cancer. The toxicity of bromine and fluoride are exacerbated in an iodine-deficient state. Perhaps the reason we have an epidemic of breast cancer is not only due to iodine deficiency, but also to the toxicity of the halogens fluoride and bromine which inhibit iodine uptake by the tissues of the body. Effective breast cancer therapies will not be realized until the causative factors of breast cancer are more thoroughly studied.

### **THE JAPANESE: A POPULATION WITH A HIGH IODINE INTAKE AND A LOW RATE OF BREAST DISEASE AND GOITER**

It has been estimated that the mainland Japanese ingest approximately 13.8mg of iodine per day, which is over 100 times the RDA.<sup>42</sup> Japanese from the coastal areas ingest more iodine than the average inland Japanese consume. The mainland Japanese receive much of their iodine from seaweed, which is known to concentrate iodine.

What is the effect of ingesting this larger amount of iodine? The Japanese, who consume a large amount of iodine by U.S. RDA standards, have remarkably lower levels of breast, endometrial, and ovarian cancers. In addition, there is a significantly lower amount of fibrocystic breast disease in Japanese women who consume the larger amount of iodine. Over 30 years ago, research showed that Japanese women who move to the United States have a higher rate and mortality of breast, endometrial, and ovarian cancer as compared to mainland Japanese women.<sup>43</sup> I believe this increase in mortality of Japanese women is due to falling iodine levels.

It has been known for over 50 years that there is an association between breast cancer and iodine levels. There have been many articles written in medical literature pointing towards a direct relationship between low iodine levels and the development of breast cancer in various regions of the world, including the United States.<sup>44 45</sup>

Joyce, 52 years old, was diagnosed with breast cancer two years ago. "I thought I was in great shape. I used to exercise, and I watched what I ate. When I was diagnosed with breast cancer, I was devastated," she said. Joyce did not want to undergo chemotherapy and radiation. Joyce claimed, "I did not have a chemotherapy and radiation deficiency. I have done a lot of reading on breast cancer, and I was worried about the side effects from the chemotherapy and radiation. I wanted to search for an underlying cause and find a treatment for that." Joyce had a long history of fibrocystic breast disease and dense breasts on a mammogram. My initial examination and laboratory workup of Joyce revealed an enlarged thyroid gland (i.e., goiter). Laboratory tests showed evidence of a poorly functioning immune system (low natural killer cells and low immunoglobulin levels as well as a low white blood cell count). An iodine-loading test showed Joyce was extremely low (12% excretion with normal levels >90%). Joyce was treated with a combination of iodine/iodide (Iodoral®) four pills per day (50mg of iodide/iodine) for three months. After three months, her iodine-loading test improved to normal and her dose of iodine was lowered to two pills per day (25mg). During that time, Joyce noticed an improvement in her energy and overall better health. "I felt wonderful once I started taking iodine. My energy level zoomed up and my metabolism increased. All my friends started asking me what I was doing, since I looked so much better," she said. Joyce was also treated holistically with a detoxification program and given vitamins and minerals. Her laboratory markers all improved as well. Her doctors felt the changes in her breasts. "My doctor told me that my breast tissue felt much softer. He said that my breasts felt much healthier," she claimed. With her improved laboratory markers, I feel Joyce will have a better chance to overcome her illness. Was iodine deficiency the underlying cause of her cancer? I don't have the definitive answer to that question, but an iodine-deficient state will not only set the stage for breast illness such as cancer to develop, it will make it extremely difficult for the body to overcome such illnesses. Update on Joyce: After three years of iodine supplementation, Joyce's iodine loading test is now normal (92% excretion). She continues to feel well and there have been no signs that the cancer is progressing. The initial lesions seen on radiologic exam have gotten slightly smaller. Joyce is seen by a surgeon and she undergoes radiologic tests every six months.

New 5<sup>th</sup> Edition Update on Joyce: Joyce is still supplementing with iodine and feeling well. There are still no signs of progression of the cancer. Joyce recently stated, "The best decision I made was to go the holistic route. The iodine has really helped me out. I am thankful for how good I feel."

### **IODINE DEFICIENCY AND PROSTATE CANCER**

Although the research is not as complete as it is for breast cancer, I believe the cause of prostate cancer in men is similar to the cause of breast cancer in women. Japanese men have much lower rates of prostate cancer than American men. Japanese men that move to the United States have a higher rate of prostate cancer than mainland Japanese. This analogy is similar to the increased incidence of breast cancer in Japanese women who move to the United States. I believe iodine deficiency is the link (or at least one of the links) and is responsible for the increased risk of prostate cancer. Mainland Japanese men have a much lower prostate cancer mortality rate than American men because of their higher iodine intake. When iodine levels fall, the rates of prostate cancer will begin to increase. I believe future research needs to be directed in this area.

### **ANIMALS IN AN IODINE-DEFICIENT STATE WILL DEVELOP BREAST CANCER**

Animal research has shown that in an iodine-deficient state, whether by diet or drug therapy, animal breast tissue will show signs of developing breast cancer. The longer the animals are maintained in an iodine-deficient state, the more likely their breast tissue will become cancerous.<sup>46 47</sup> Researchers have concluded, "It thus appears that maintenance of the optimum structure and function of the breasts requires the presence of continuous and specific amounts of iodine."<sup>48</sup> The use of estrogens causes worsening changes in the breast tissue, with additional signs of cancer being present upon examination of tissue.<sup>49</sup> In fact, iodine deficiency is found to enhance the response of animal breast tissue to estrogen injections.<sup>50</sup> The epidemic of breast cancer we are currently facing could be explained by the combination of iodine deficiency coupled with the increasing exposure to xenoestrogens. Xenoestrogens are estrogen-like substances that can disrupt our own estrogen receptors. Examples of xenoestrogens include environmental toxins such as bisphenol A (BPA) and phthalates from plastics. We are exposed to increasing amounts of synthetic hormones from estrogen-like hormones (i.e., xenoestrogens) fed to conventionally-raised animals. These synthetic hormones make their way into our food products. With one in seven women suffering with breast cancer and one in three men having prostate cancer, things may look bleak.

However, there is hope. Eating an organic diet free of food contaminated with synthetic hormones is a good start. The next step is to reverse an iodine-deficient condition and maintain iodine sufficiency.

Iodine deficiency disorders can easily be corrected with the addition of iodine to the diet. The correction of iodine deficiency in animals results in changing their breast tissue to assume a more normal architecture. I have observed similar results in many of my patients.

Many other tissues in the body utilize iodine besides the thyroid gland and the breasts. The prostate gland, gastrointestinal tract, salivary glands, bones, connective tissues, and the fluids of almost the entire body utilize iodine. These different tissues of the body all have developed iodine-trapping mechanisms to effectively extract iodine from dietary sources. The breasts have an

efficient method of acquiring iodine from the diet.<sup>51</sup> The thyroid gland's need for iodine will ensure that it has the "first pick" of iodine which, in a deficient state, may mean that other tissues of the body can show signs of severe deficiencies.

The iodization of salt was introduced solely to decrease the rate of goiter and mental retardation. It has decreased the prevalence of goiter, but it has not been enough to affect the rate of breast disease. In fact, areas of the world with the lowest iodine intakes have been found to have very high rates of breast cancer.

In the United States, the area known as the "goiter belt", which borders the Great Lakes, not only has one of the highest mortality rates from breast cancer, it also has extremely low iodine levels in the soil. This would point to a direct relationship between iodine levels and development of and mortality from breast cancer.

When iodine is ingested or injected, there are two major areas of the body that take up iodine: the thyroid gland and the extra-thyroidal tissue. Researchers have estimated that approximately 8mg of iodine is taken up by the extra-thyroidal tissue (while 6mg is taken up by the thyroid).<sup>52 53</sup> The breasts are one of the largest consumers of extra-thyroidal iodine. Estimates are that the breasts need approximately 5mg of iodine per day in a 50kg (110lb) woman.<sup>54 55 56</sup> A larger woman (or a woman with larger breasts) would have a greater amount of iodine concentrated in the breasts. Since men have smaller breasts than women, their iodine needs are lower.

In a state of iodine deficiency, the body's major storage of iodine occurs in the thyroid gland. When the body becomes iodine sufficient, the thyroid gland will contain 50mg of iodine out of total body iodine of 1,500mg-2,000mg.<sup>57 58</sup> At iodine sufficiency, the largest amounts of iodine are found in fat tissue and muscle (striated) tissue. If obesity is present, the body's need for iodine increases as the fat cells of the body would require more iodine.

As previously mentioned, women's breasts are major sites for iodine storage. Maintaining adequate iodine levels are necessary to ensure an adequately functioning thyroid gland and normal breast architecture. I believe it will also lower the incidence of breast cancer and help women overcome breast cancer.

It is well known that thyroid illnesses, including goiter and autoimmune thyroid disorders, strike women at much larger percentages than they strike men. One reason may be that a woman, having more breast tissue than a man, requires a higher iodine intake than a man. In an iodine-deficient state, a woman will show earlier signs and more severe signs of iodine deficiency than a man in a similar deficient state.

### OTHER TISSUE REQUIREMENTS FOR IODINE

All of the glands of the body depend on adequate iodine levels to function optimally. Animal studies have shown problems with the adrenal glands<sup>59</sup>, the thymus gland<sup>60</sup>, the ovaries<sup>61</sup>, the hypothalamus and pituitary axis<sup>62</sup>, as well as the entire endocrine system, when there is an iodine-deficient state. In fact, the ovaries have the second highest concentration of iodine in the body next to the thyroid gland. An iodine-deficient state will lead to an imbalanced hormonal system. It is impossible to have a balanced hormonal system without ensuring an adequate iodine intake.

Dr. Guy Abraham, one of the world's leading researchers on iodine, has shown that the required daily intake of iodine necessary for maintaining iodine sufficiency for the whole body is at least 13mg per day.<sup>63</sup>

At sufficiency, the thyroid gland holds a total of approximately 50mg of iodine. The thyroid gland needs approximately 6mg/day of iodine for sufficiency. The breasts need at least 5mg of iodine; that leaves 2mg (13mg-11mg) of iodine for the rest of the body. This 2mg is still well above—14x—the RDA of 150µg/day of iodine. Either way, this would explain why the RDA for iodine is inadequate. To achieve and maintain your optimal health, it is necessary to get your iodine levels evaluated and to supplement with the correct amount and form of iodine.

### FINAL THOUGHTS

The connection between iodine deficiency and breast cancer as well as fibrocystic breast disease is strong and recent research is making this connection stronger. Breast cancer (like prostate cancer) is occurring at epidemic rates—currently one in seven women are afflicted. Prostate cancer affects one in three men. Although there are numerous reasons for the development of cancer, the research is clear; iodine deficiency is a major piece of the puzzle. Iodine deficiency has also been associated with other cancers including ovarian, uterine, and thyroid cancer. Perhaps the reason we have made so little progress in our treatment of nearly all of the hormone-sensitive cancers is that the underlying cause has been overlooked. This underlying cause could very well be iodine deficiency. It is imperative to have your iodine level checked and supplemented with the correct form of iodine when there is iodine deficiency identified. I feel iodine status should be investigated in all cancer patients. The best results with iodine therapy occur when iodine supplementation is given as part of an anti-cancer program.

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## Chapter 9

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### *The Importance of Iodine Before Pregnancy*

## CHAPTER 9: THE IMPORTANCE OF IODINE BEFORE PREGNANCY

For nearly 100 years, it has been known that iodine deficiency is associated with a lowered intelligence quotient (IQ). In fact, the research has been clear: iodine deficiency can result in mildly to severely lowered IQ levels. Cretinism, the most severe form of iodine deficiency, was first described in the late 18<sup>th</sup> century. Cretinism is associated with severe mental deterioration and significantly lowered IQ levels, swelling of the skin, hair loss, and short stature. Neurological impairment with reduced muscle tone and slowed reflexes are also present in cretinism. Unfortunately, cretinism is still present in remote areas of the world.

With the advent of iodized salt, cretinism has largely been eliminated in the Western world. Although we don't see cretinism, iodine deficiency is still occurring throughout the U.S. It is my premise that iodine deficiency is occurring at epidemic rates in the U.S. and other Western countries.

As previously mentioned I, along with my partners, have tested over 6,000 patients and found iodine deficiency present in over 96% of those tested. You read those numbers correctly—over 96% tested low, with most testing moderately to severely low. This testing was done via urine, blood, and saliva screening. Over the years, urine testing has been the predominant modality used. The urine testing was done with spot tests as well 24-hour iodine loading tests. The results that I have seen leave no doubt: Iodine deficiency is still occurring at epidemic rates.

In fact, recent reports from the National Health and Nutrition Examination Survey (2005-2008) found that nearly 60% of women of childbearing age are deficient in iodine.<sup>1</sup> Iodine levels have declined over 50% over the last 40 years.<sup>2</sup> Although many health care experts claim that iodine deficiency is a problem of the past, I can assure you of one thing; these health experts are wrong. Unfortunately, iodine deficiency is not an old story—it is still present in America and many other Western countries today.

### What are the Consequences of Iodine Deficiency in Pregnancy?

#### 1. Lowered Childhood IQ

As I previously mentioned, one of the main consequences of iodine deficiency in pregnant women is a lowered IQ in their children. I have been lecturing to doctors for over a decade about how important it is to ensure that women of child-bearing age are iodine sufficient before they become pregnant.

Both the brain and neurological system are formed during the first trimester. The fetus is dependent on the mother supplying enough iodine to stimulate normal neurological formation. Inadequate maternal iodine can leave the child with permanent neurological damage and a lowered IQ. It is unclear if iodine supplementation after birth will reverse the neurological problems obtained from the lack of iodine during pregnancy.

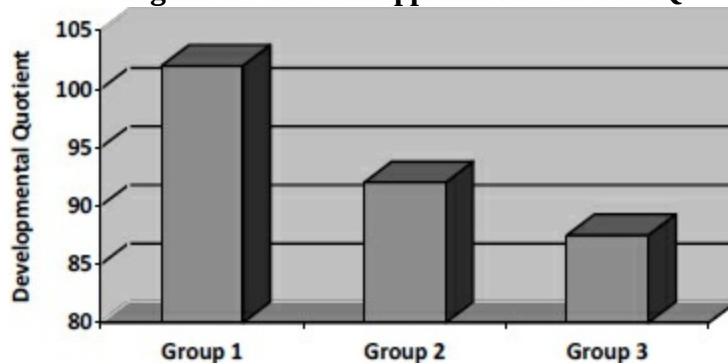
In the latest NHANES (2009-2010) data, the median urine iodine levels for U.S. pregnant women are low at 134 $\mu\text{g}/\text{L}$ .<sup>3</sup> According to the World Health Organization, this median level would supply insufficient iodine to the fetus.<sup>4</sup> Keep in mind, mild maternal iodine deficiency can cause thyroid dysfunction and neurological deterioration. A meta-analysis of 18 studies of children and adolescents found iodine deficiency was associated with a 13.5 point lower IQ score in children and adolescents.<sup>5</sup>

The importance of early iodine supplementation in pregnancy was illustrated when researchers studied three groups of pregnant women.<sup>6</sup> All three groups were supplemented with potassium iodide (KI) at 200 $\mu\text{g}/\text{day}$ . Keep in mind, the RDA for iodine in pregnancy is 220 $\mu\text{g}/\text{day}$ . In this study the women were divided into three groups:

- Group 1: Supplemented with KI 200 $\mu\text{g}/\text{day}$  at 4-6 weeks of gestation
- Group 2: Supplemented with KI 200 $\mu\text{g}/\text{day}$  at 12-14 weeks of gestation
- Group 3: Supplemented with KI 200 $\mu\text{g}/\text{day}$  after delivery

All of the children born to these mothers were given a neurocognitive evaluation at 18 months of age and reported these results as the developmental quotient (DQ). The DQ, similar to the IQ measurement, is used to compare a child's functioning as compared to a normative group. For both the IQ and the DQ, the average score is 100. The researchers found a significant difference in the DQ between the three groups. As seen in [Figure 17](#) (next page), the children in group 1, who were supplemented with iodine in the first trimester had the highest average DQ score of 102. Group 2, supplemented with iodine at the beginning of the second trimester had a DQ of 92 while Group 3 had a DQ of 87.

**Figure 17: Iodine Supplementation and IQ**



The authors of this study reported that there was delayed neurobehavioral performance observed in 36% of the children in group 3, 25% of the children in group 2 and none of the children in group 1. They summarized this study by stating, “A delay in 6-10 weeks of iodine supplementation...at the beginning of pregnancy increases the risk of neurodevelopmental delay in the progeny.”

## 2. Decrease in Educational Ability

Scientists hypothesized that, as compared to children born to mothers with adequate iodine levels, children born to mothers with mild iodine deficiency would have poorer educational outcomes. Nine years later, the children of the mothers who had mild iodine deficiency—urinary iodine <150 $\mu\text{g/L}$ —were compared to the children from mothers without iodine deficiency. As compared to the children born to mothers with adequate iodine levels, nine years later in grade 3, the children of the iodine-deficient mothers had a 10% reduction in writing, 8% reduction in grammar and a 6% reduction in English literacy.<sup>7</sup>

## IT IS IMPORTANT TO ENSURE ADEQUATE IODINE LEVELS BEFORE PREGNANCY

It is important to ensure adequate iodine levels in young women before they become pregnant. In order for the fetus to develop normally, adequate amounts of iodine are required by the mother. In-utero iodine deficiency has been associated with a host of ailments in children including attention deficit/hyperactivity disorder (ADHD), depression, cretinism, dwarfism, and mental retardation. Iodine deficiency has also been associated with poor height and bone maturation of children.<sup>8 9</sup> Furthermore, there is a decreased neonatal survival rate in iodine-deficient areas. In fact, neonatal mortality has been shown to decline over 50% when iodine deficiency is rectified.<sup>10</sup> Unfortunately, in the twenty-first century, iodine levels are continuing to fall for the vast majority of Americans. [Chapter 13](#) will provide more information about iodine dosing during pregnancy.

## IODINE, GROWTH HORMONE, AND THYROID HORMONE

Growth hormone deficiency is a condition in children and adults whereby the pituitary gland fails to produce adequate amounts of human growth hormone. Growth hormone deficiency in children is not uncommon. Estimates are that from 1 in 4,000 to 1 in 10,000 children suffer from human growth hormone deficiency.<sup>11</sup> The incidence of human growth hormone deficiency in children appears to be increasing.

Why would the incidence of human growth hormone deficiency be so prevalent? Low iodine levels may provide the explanation for this. Researchers have hypothesized that, “...improved growth in iodine-deficient children receiving iodine is likely due to improved thyroid function {as} both thyroid hormone and {human} growth hormone are essential for normal growth and development.”<sup>12</sup> These same researchers reported on a study of severely iodine-deficient children who were given iodine. The authors reported that there was a significant increase in thyroid function, human growth hormone, and somatic growth in the treated group versus the untreated group.

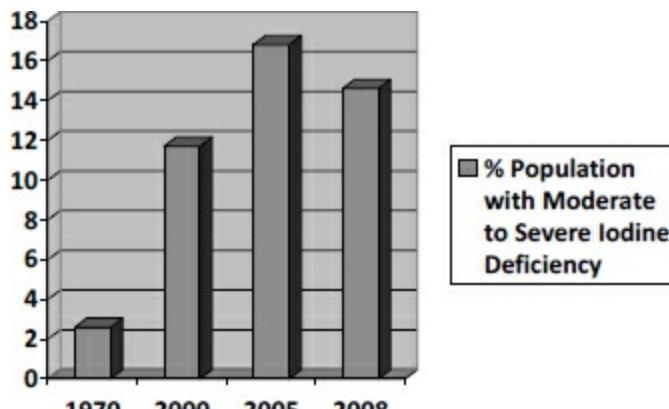
Researchers studied three groups of children to determine whether iodine repletion improves growth hormone levels and somatic growth in iodine-deficient children. The studies were double blinded, prospective studies from three areas of the world—Morocco, Albania, and South Africa. In all three studies, iodine supplementation increased urinary iodine levels and resulted in elevated growth hormone levels (increased IGF-1 levels.) In two of the three sites, iodine repletion resulted in increased thyroid hormone levels as well as weight-for-age scores and height-for-age scores.<sup>13</sup>

Both thyroid hormone and human growth hormone are essential for normal growth and development.<sup>14 15</sup> In children (or an individual not fully grown), human growth hormone stimulates growth in length. In adults, human growth hormone does not stimulate growth in length but has a whole host of beneficial effects in the body including stimulating muscle growth, fat metabolism, and energy production. For more information on human growth hormone in adults, I refer the reader to my book,

[\*The Miracle of Natural Hormones, 3rd Edition.\*](#)

**IODINE LEVELS FALLING IN WOMEN OF CHILDBEARING AGE**

Researchers have reported on the falling iodine levels in women of childbearing age and pregnant women for over 40 years. Recall ([Chapter 2](#)) that the National Health and Nutrition Examination Survey (NHANES) has found that over the last 40 years (from 1970-2010), iodine levels have fallen in the United States over 50 percent. In fact, the most recent NHANES data found that nearly 60% of U.S. women of childbearing age were iodine deficient.<sup>16</sup> I believe this decline in iodine intake has significantly contributed to (or perhaps caused) the epidemic of behavioral (ADHD) and emotional (depression) problems affecting our children. Furthermore, it is fueling the epidemic of thyroid problems seen in our young people.



**Figure 18: Iodine Levels Over Time**

The World Health Organization has declared that a urinary iodine concentration (spot urine check) of less than 50 $\mu\text{g}/\text{L}$  is a sign of moderate to severe iodine deficiency. Urinary iodine concentrations less than 20 $\mu\text{g}/\text{L}$  are considered severe iodine deficiency.<sup>17</sup> The proportion of the United States population with moderate to severe iodine deficiency (less than 50 $\mu\text{g}/\text{L}$  in urine) has increased by over 450 percent from 1970-2000; from 2.6% in NHANES I (1970) to 11.7% in NHANES II (2000).<sup>18</sup> Unfortunately, things have only gotten worse. Researchers reported in 2005 that 16.8 percent of women of childbearing age had moderate to severe iodine deficiency. In 2008, the latest data available, 14.6% of women of childbearing age were found to be moderately to severely iodine deficient.<sup>19</sup> [Figure 18](#) (previous page) shows the increasing prevalence of moderate to severe iodine deficiency over the last 38 years.

A study of 100 healthy, pregnant Bostonians found that 50% were ingesting below the recommended daily allowance of iodine (220 $\mu\text{g}/\text{day}$ ) and 9% were felt to have moderate to severe iodine deficiency (less than 50 $\mu\text{g}/\text{day}$  on a urine analysis).<sup>20</sup>

#### FINAL THOUGHTS

Iodine is a crucial item needed by a fetus for normal neurological development. Unfortunately, iodine deficiency is not rare in the U.S. Keep in mind that iodine levels have fallen over 50% during the last forty years. And, iodine deficiency is occurring at epidemic rates in women of childbearing age. Unless we correct this public health problem, I do not see U.S. childhood health improving. The next chapter will expand on this concept.

I can't emphasize this point enough: It is important for every woman to have her iodine levels tested before pregnancy and to supplement with iodine when needed.

How much iodine is that? In an optimal situation, the dose should be individualized for the particular patient. However, many patients cannot find iodine-knowledgeable health care practitioners. Researchers believe the average Japanese intake of iodine is approximately 12-13mg/day. I have not found problems with this dose for the vast majority of patients that I have treated.

One final thought; keep in mind that it is important to ensure adequate iodine intake for all ages—that includes children after they are born. More information about childhood dosing of iodine can be found in [Chapter 10](#).

<sup>1</sup> Thyroid. Vol. 21 N. 4. 2011

<sup>2</sup> [CDC.gov](#). NHANES data.

<sup>3</sup> Thyroid. Vol. 23. N. 8. 2013 p. 927-937

<sup>4</sup> Paediatric and Perinatal Epidemiology. 2012. 26 (Suppl. 1), 108-117

<sup>5</sup> In Stanbury, JB (ed). The Damaged Brain of Iodine Deficiency. N.Y. 1994pp. 195-2000

<sup>6</sup> Thyroid. Vol. 19. N. 5. 2009. 511-519

<sup>7</sup>. Clin. Endocrin. And Metab. 98:1954-62. 2013

<sup>8</sup> Int. J Vit. Nutr. Res. 65:199-205 1995

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<sup>10</sup> Lancet. 1997. Sep. 13; 350(9080):771-3

<sup>11</sup> From <http://www.lilly.ca/searchable/cons/children.htm> Accessed 11.15.08

12 J. Clin. Endocrin. Metab. E Pub ahead of print. 11.21.08 as doi:10.1210/jc.2006-1901

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## Chapter 10

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*Children, ADHD, Autism, and Iodine*

## CHAPTER 10: CHILDREN, ADHD, AUTISM, AND IODINE

Dawson, at 7 years old, was driving his parents and his teachers crazy. “He is constantly up and down. He can’t pay attention. He can’t focus. His teachers are always complaining to me,” his mother (Stephanie) commented. When I saw Dawson, he was found to have a low basal body temperature (95.7 degrees Fahrenheit—normal 97.8-98.2 degrees Fahrenheit). Low basal body temperatures can be associated with thyroid problems. Stephanie also let me know that Dawson had been suffering from severe constipation for many years. Constipation is a sign of hypothyroidism. Dawson also had very slow reflexes on exam. Dawson’s blood tests did not indicate a thyroid problem but a urinary test did indicate that Dawson was low in iodine. Due to his complaints and low temperatures, I placed Dawson on a small dose of desiccated thyroid hormone (Armour® thyroid ¼ grain) and iodine (6.25mg of Iodoral®). I also gave Stephanie advice on how to clean up his diet. Within days, Stephanie noticed the positive changes in Dawson. In fact, she sent me an email that read:

“I thought you would like to see Dawson’s latest report card comments (attached). He used to be reserved and did not want to interact socially. He has been on Armour® thyroid for six weeks now and the teacher has noticed that he has changed in personality and attentiveness. Maybe all the kids being diagnosed with ADD/ADHD are really hypothyroid. I am so thankful that he had help available to him. My mom commented on Easter that my kids were like two different children. I agree. Dawson could not sit in his chair at meal time. He was up and down and up and down. It drove us crazy. Now he sits through the entire meal and eats. I have not heard that his stomach hurts (which used to be every night) since the first week he was on the thyroid meds.”

Dawson’s case is not unique. Every child with a diagnosis or symptoms of ADHD needs to have a complete nutritional and hormonal evaluation. The use of psychoactive drug therapies to treat this condition should only be used as a last resort. Many of these young patients suffering from ADHD will respond positively to a holistic approach which includes cleaning up the diet. More information on how to implement a healthy diet can be found in [The Guide to Healthy Eating](#).

At every lecture I give, I am invariably asked the question, “Do children need to take iodine?” The quick answer is “yes”. This chapter will give you the explanation behind this answer.

The World Health Organization estimates that there are over 285 million school-age children worldwide who are iodine deficient<sup>1</sup>. Just as adults need iodine, children also need it. Since children’s brains are growing and developing on a daily basis, it may be more important for children to take adequate amounts of iodine in their diets than adults. This chapter will show you the importance of supplementing with iodine before pregnancy and the necessity of continuing iodine supplementation in children of all ages.

The World Health Organization has recommended that the daily iodine intake for children should be.<sup>2</sup>

90µg for preschool children (0-59 months)

120µg for schoolchildren (6-12 years)

150µg for adults (above 12 years)

200µg for pregnant and lactating women

It is my opinion that these recommendations are not sufficient for ensuring adequate iodine levels in our children (or adults). The consequence of iodine deficiency in childhood can be devastating. I will show you how the growing incidence of attention deficit/hyperactivity disorder (ADHD) may be directly related to iodine deficiency. Children are suffering from epidemic rates of emotional and mental disorders such as attention deficit/hyperactivity disorder (ADHD) and depression. Estimates are that from seven to sixteen percent of school-aged children suffer from ADHD.<sup>3</sup> ADHD is not a deficiency of a mood-altering drug; it is a consequence of nutritional and hormonal imbalances. Iodine is one such nutritional item that needs to be optimized in all children, especially those with ADHD.

### IODINE AND ADHD

ADHD is being diagnosed at an epidemic rate. Why would ADHD be occurring at such a high rate? There is no question that if Big Pharma has a drug available to treat an illness, it will promote, through direct-to-consumer advertising, a campaign to increase the awareness and utilization of the drug in order to maximize profits. I believe ADHD is overdiagnosed and overtreated. Having said that, I do believe that over the last 40 years ADHD behavior is increasing in frequency.

Many experienced educators report an increased frequency in student ADHD behavior during their tenure. At the present time, something is clearly going on in many children that is not allowing them to focus properly and causing them to act out with inappropriate behavior.

I do not believe that ADHD is a condition caused by a lack of a mood-altering drug such as Ritalin® or Concerta®. I believe ADHD is a condition caused in large part from nutritional and hormonal imbalances as well as an increased toxic load.

I have found good results in treating ADHD children—as well as other children with behavioral and emotional problems—with nutritional therapies and detoxification.

Studies have shown that correcting iodine deficiency in an iodine-deficient population decreases the frequency of ADHD. My experience has shown iodine deficiency to be present in over 96% of the nearly 6,000 patients that have been tested in my office. This includes the testing of many children. Though I do see more adults than children, I have found iodine deficiency occurs in children in the exact same frequency that it occurs in adults—over 96%.

Italian researchers compared 16 women from an iodine deficient area of Italy to 7 women from a higher iodine area. All the women were pregnant. The women from the iodine-deficient area had a reduced thyroid hormone (total T4 and free T4) with elevated TSH as compared to the higher iodine area. The researchers concluded, ‘It is hypothesized that the imbalance of maternal thyroid hormone homeostasis during pregnancy as a consequence of endemic iodine deficiency may be responsible for the impaired psychoneurological development observed in children from that area. Appropriate iodine and/or thyroxine prophylaxis to women in that region may prevent the neurobehavioral, cognitive, and motor compromise of that population.’<sup>4</sup>

Further research found higher levels of ADHD in the children of women who lived in an iodine-deficient area as compared to women who lived in an iodine-sufficient area. After 10 years of follow-up, researchers found that ADHD was diagnosed in 11/16 (69%) in the iodine-deficient area versus none (0/11) in the iodine-sufficient area. Furthermore, there was an 11 point decline in IQ in those children born in the iodine-deficient area as compared to the children born in the iodine-sufficient area. An 11 point decline in IQ can mean the difference between a successful child and a troubled child.

#### AUTISM AND IODINE DEFICIENCY

Autism has been increasing at an alarming rate. In 1980, it was estimated that autism was occurring in 1 in 10,000 children. In 1995, the CDC estimated that 1 in 500 children suffered with autism. In 2008, it increased to 1 in 88. The 2008 numbers reflect a 78% increase in eight years and a staggering 11,400% increase since 1980. The CDC’s autism analyses are shown in [Table 7](#).<sup>5</sup>

**Table 7: Autism Rates 2000-2008**

Surveillance Year	Birth Year	How Many Children Have Autism
1980	1972	1 in 10,000
1995	1987	1 in 500
2000	1992	1 in 150
2002	1994	1 in 150
2004	1996	1 in 125
2006	1998	1 in 110
2008	2000	1 in 88

These numbers are hard to believe. Why has autism increased at such a rapid rate? There are many theories that try to explain why autism is rising which include toxic exposures to children from vaccines, mercury, and/or pesticides. Furthermore, some think that the rise in autism is related to overdiagnosing it. However, overdiagnosing autism cannot explain the epidemic increases seen. One overlooked cause of the epidemic rise in autism could be iodine deficiency.

Researchers have reported a pattern of iodine decline in a population and a concomitant increase in autism in the U.S., New Zealand, Australia, England, and Italy.<sup>6 7 8 9</sup>

#### WHY CHILDREN NEED IODINE

Children (and adults) need iodine for the normal formation and maintenance of their endocrine glands (e.g., thyroid and ovaries) and for normal brain development. Inadequate iodine levels, as previously mentioned, will set the stage for poor development and a lifelong history of learning problems.

I believe that the iodine requirements for children have increased over the last 30 years, just as they have increased for adults. The main reason the requirements have increased is due to additional exposure to goitrogens such as bromide, fluoride, and chlorine derivatives. Iodine supplementation can act as the antidote for goitrogen exposure.

My clinical and laboratory experience has clearly shown that bromide toxicity is occurring at epidemic proportions. I have continually found that bromide toxicity is occurring in most individuals. For more information on bromide, I refer the reader to

## HOW TO TEST CHILDREN FOR IODINE

Children, like adults, can be tested for iodine sufficiency. The iodine loading test will be discussed in [Chapter 13](#). Children can also do an iodine loading test, but their dosage of iodine must be lowered. If a child weighs less than 80 pounds (36kg) he can take 12.5mg of iodine/iodide (1 Iodoral tablet or 2 drops of Lugol's solution) in the morning. Then, 24 hours of urine is collected and a sample is sent for analysis. It is important to let the laboratory know that it is a child being tested and that the child did not take the usual adult loading test iodine amount (50mg). Both laboratories (FFP and Hakala) listed in the appendix of the book will perform an iodine loading test on children.

Children can also be spot urine tested. This can be done as a first morning urine sample. The spot urine test is only accurate for those not taking an iodine supplement. Once the child has started to supplement with iodine, the appropriate test becomes the 24-hour iodine loading test as described above.

## DOSING A CHILD WITH IODINE

How much iodine do you supplement a child with? It is important to remember that every individual is a unique biochemical person. No one dose fits all. My experience has shown that iodine (in the form of iodine and iodide) dosed at 0.25mg/kg/day (or 0.11mg/pounds/day) is an approximate amount of iodine to ingest for most children. However, I do not suggest supplementing a child with iodine without working with an iodine-knowledgeable health care provider who can properly test and follow your child's laboratory results.

## FINAL THOUGHTS

Do children need iodine? Without a doubt, the answer is "yes". Children need adequate amounts of iodine to form the normal architecture of the glandular tissue as well as for the optimal function of the thyroid gland and the entire endocrine system.

Due to the continual and steady exposure to the toxic goitrogens so prevalent in our modern environment, iodine supplementation is more important than ever, especially in children. I believe that iodine deficiency is one of the main causes (or the main cause) of ADHD and autism. ADHD and autism are occurring at epidemic rates right now. These illnesses are not due to a deficiency of a dangerous psychotropic medication. I feel they are both signaling that there is an imbalance in the body, particularly a sign of a nutritional and hormonal imbalance. The rapidly falling U.S. iodine levels could explain why we are suffering from an epidemic of both ADHD and autism as well as other childhood behavioral and physical problems.

Rectifying iodine deficiency should be considered a national emergency addressed by the highest levels of the U.S. government. We are experiencing a collapse of the health of our future—our children. However, all is not bleak. Just as illustrated in Dawson's case (at the beginning of the chapter), finding the underlying cause of the illness and instituting appropriate therapies can reverse this decline. In both children and adults, iodine deficiency needs to be recognized and treated.

<sup>1</sup> Lancet. 362:1859-60. 2003

<sup>2</sup> [www.emro.who.int/nutrition/PDF/IDD.PDF](http://www.emro.who.int/nutrition/PDF/IDD.PDF) accessed 11.15.08

<sup>3</sup> Archives of Pediatrics and Adolescent Med. 2002; 156:217-224

<sup>4</sup> Clin. Endocr. 1005 Apr; 42(4)/ 409

<sup>5</sup> <http://www.cdc.gov/ncbddd/autism/data.html>. Accessed 7.1.13

<sup>6</sup> Brit. Med. J. 2004;328:227

<sup>7</sup> Arch. Des. Child. Fetal Neonatal Ed. 2004. Sep; 89(5):F436-9

<sup>8</sup> Med. J. Aust. 2003; 178(4):159-162

<sup>9</sup> Asia Pac. J. Clin. Nutr. 2003; 12. Suppl. S15

## Chapter 11

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### Toxic Halides: Bromide and Fluoride

## CHAPTER 11: TOXIC HALIDES: BROMIDE AND FLUORIDE

Iodine is part of a class of elements known as the halogens. The halogens are a family of elements that form similar salt-like compounds in combination with sodium and most metals. The halogens are bromine, chlorine, fluorine, iodine, and astatine. The halogens, for chemistry enthusiasts, are found in group VIIa of the periodic table.

### BROMINE

Bromine was discovered in 1826. Bromide, (the reduced form of bromine), is rapidly absorbed in the intestinal tract. Bromine lies just above iodine in the periodic table. Because the size and weight of bromine is very close to iodine, these two items can compete with one another for binding in the body, especially in the thyroid gland. Bromine, being of similar size and shape to iodine, has the ability to bind to iodine receptors in the body.

However, bromine should be considered a toxic element to the body and needs to be avoided. When bromine binds to iodine receptors in the thyroid gland, it disrupts normal thyroid functioning. Iodine is utilized by the thyroid to make thyroid hormone. When bromine replaces iodine, the thyroid hormone produced by the thyroid gland can be brominated rather than iodinated. My experience has clearly shown that bromine toxicity leads to a plethora of thyroid problems, including autoimmune thyroid illnesses such as Graves' disease and Hashimoto's disease as well as hypothyroidism. Since iodine and bromine compete with one another for absorption and receptor binding, the body can only eliminate bromine if there is sufficient iodine available.

Bromine intoxication (i.e., bromism) has been shown to cause delirium, psychomotor retardation, schizophrenia, and hallucination.<sup>1</sup> Subjects who ingest enough bromide feel dull and apathetic and have difficulty concentrating.<sup>2</sup> Bromide can also cause severe depression, headaches, and irritability. It is unclear how much bromide must be absorbed before symptoms of bromism become apparent. The symptoms of bromide toxicity can be present even with low levels of bromide in the diet.<sup>3</sup> Keep in mind, that when the body has insufficient iodine, the toxicity of bromine is accelerated.

Bromine (or its reduced form—bromide) is used as an antibacterial agent for pools and hot tubs. It is still used as a fumigant for agriculture. Crops sprayed with bromide have been found to have elevated bromide levels.<sup>4</sup> Bromide is also used as a fumigant for termites and other pests. In 1981, 6.3 million pounds of bromide were used in California. By 1991, 18.7 million pounds were used in California.<sup>5</sup> Toxicity of bromine has been reported from the ingestion of some carbonated drinks (e.g., Mountain Dew, AMP Energy Drink, some Gatorade products), which contain brominated vegetable oils.<sup>6</sup>

Bromine used to be present in many common over-the-counter medications. It is still used today in many prescription medicines. Over 150 years ago, bromine was used extensively in medicine as a sedative as well as a remedy for seizures. Due to the toxicity of bromine, it has been phased out of many medicines. However, bromine still can be found in some medicines including those that treat asthma, and bowel and bladder dysfunction (see [Table 8](#) on next page).

I believe all medicines, as well as foods, that contain bromide need to be avoided. It is lunacy to use bromine in any form (either bromine or bromide) as a medicine. Animal studies have shown that bromide intake can adversely affect the accumulation of iodide in the thyroid and the skin.<sup>7</sup> Research has also shown that a high bromide intake results in iodide being eliminated from the thyroid gland and being replaced by bromide.<sup>8</sup> In addition, animal studies have shown that the ingestion of bromide can cause hypothyroidism.<sup>9</sup> When there is iodine deficiency present, the toxicity of bromide is accelerated. Therefore, maintaining adequate iodine levels is essential when you live in an environment that provides exposure to bromide.

**Table 8: Currently Used Bromide-Containing Medications**

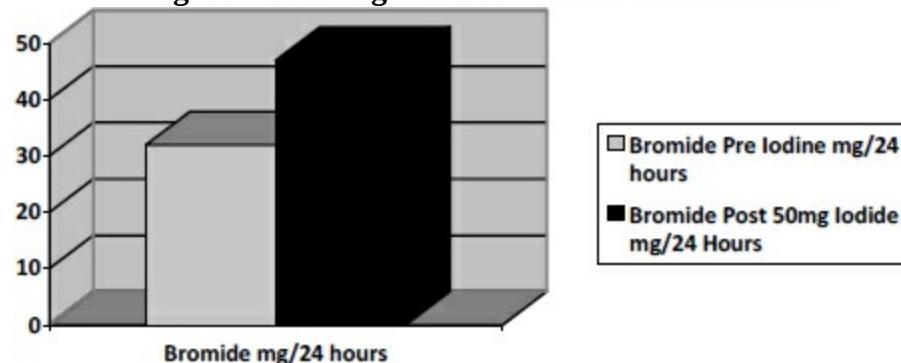
Medicine	Indication
Atrovent Inhaler	Breathing Difficulties
Atrovent Nasal Spray	Breathing Difficulties
Ipratropium Nasal Spray	Breathing Difficulties
Pro-Banthine	Bladder Dysfunction
Pyridostigmine bromide	Antidote for Nerve Gas
Spiriva® Handihaler®	Breathing Difficulties

### HOW COMMON IS BROMIDE TOXICITY?

Unfortunately, bromide toxicity is very common. In fact, every patient (over 1,000) that I have tested for bromide levels has tested in a high range. My clinical experience has continually shown that there is a direct correlation between how ill a patient is and how high their bromide levels are. A small study comparing the bromide levels of breast cancer patients with a control group without breast cancer showed bromide levels were nearly 2x higher in the breast cancer group (see [page 232](#)).

I checked 32 new patients for their urinary bromide excretion as seen below. These patients were all new to my practice. I asked them to collect their urine for 24 hours before taking iodine and then repeating the collection the next day after taking a 50mg iodine/iodide load. The figure below shows the average results. Bromide was found to be elevated in every patient tested.

**Figure 19: Average Bromide Levels Pre/Post Iodine**



There is no known therapeutic value for bromide. Therefore, any level of bromide could possibly cause problems. You can see, from [Figure 19](#), even before the patients took iodine, they were excreting too much bromide. After taking 50mg of iodine/iodide their bromide excretion increased nearly 50% from the baseline. Ingesting iodine caused the body to excrete larger amounts of bromide. This small study illustrates the detoxifying effects of iodine. Why are bromide levels so high in so many people? The next sections will answer this question in more detail.

### BROMINE ADDED TO BAKERY PRODUCTS

Bromine is a toxic element and has no place for ingestion in man. Bromine is considered a goitrogen, which is a chemical that causes a goiter of the thyroid gland. Bromine interferes with iodide uptake and utilization in the thyroid gland.[10 11](#) There is no reason to use bromine in a medication and certainly no reason to use bromine in a common food source.

In the early 1960's, iodine was used in the manufacturing process of bakery products, including bread, as an anti-caking agent. One slice of bread contained up to 150 $\mu$ g of iodine, which was the RDA for iodine. In 1965, The National Institute of Health reported that the average iodine intake from bakery products was 726 $\mu$ g of iodine per day.[12](#) Some researchers felt that this amount of iodine could cause problems with the thyroid gland. Due to the erroneous concern of getting too much iodine from bakery products, iodine was replaced with bromine in the 1980's.[13](#)

This was a tremendous mistake. As can be seen from previous chapters, the amount of iodine in the bakery products was not even close to approaching a toxic level. The replacement of iodine by bromine not only increased the incidence of iodine deficiency, it also increased the levels of bromine in the population. This single act of replacing an essential element—iodine—with a goitrogen—bromine—might be responsible for the rapid decline in iodine levels we have experienced over the last 40 years.

The substitution of bromine for iodine in bakery products is certainly a large part of the declining iodine levels in the United States. From 1971 until 2000, the National Health and Nutrition Survey (NHANES) showed iodine levels have declined 50% in the United States.[14](#) The authors of this study claim, "This reduction may be due, in part, to changes in food production."[15](#) No doubt, these authors must be referring to the substitution of bromine for iodine.

The effects of iodine on the body have been reviewed in previous chapters. The thyroid gland, the breasts, the salivary glands, etc., all have iodine receptor sites. The consequence of bromine binding to the iodine receptors in these tissues is disastrous. In the case of the thyroid gland, thyroid hormone production will be inhibited. The ingestion of bromine in an iodine-deficient state will further exacerbate thyroid illness.

### FLUORIDE

Fluoride, like bromide, is in the family of halogens. For over 50 years, the American Dental Association has advocated the addition of fluoride to drinking water as a preventative measure against dental caries.

However, there is much evidence to suggest that fluoride added to the water supply is ineffective at preventing caries. A study in New Zealand found that there was no difference in tooth decay rates between the fluoridated and the non-fluoridated areas.[16](#) This study has been repeated elsewhere. Many European countries have recognized the fallacy of adding fluoride to the water supply and have stopped the practice. The fluoridation of the water supply has been based on terrible science and is causing much more harm than good.

Fluoridation has been linked to dental fluorosis (discoloration of the teeth), hip fractures, bone cancer, lowered intelligence, kidney toxicity, and other negative effects. There have been no studies which prove that long-term ingested fluoride has any positive effect.

Fluoride is known to be a toxic agent. Fluoride has been shown to inhibit the ability of the thyroid gland to concentrate iodine.[17](#) Fluoride was first reported to cause thyroid problems in 1854 when fluoride was found to be a cause of goiter in dogs.[18](#)

Research has shown that fluoride is much more toxic to the body when there is iodine deficiency present.

This concept was illustrated in a study of 288 mice where the mice were fed a diet with varying amounts of iodine and fluoride. The researchers found that the incidence of goiter (swelling of the thyroid) rose with the increasing intake of fluoride in a low iodine diet. Furthermore, the scientists found that fluoride exposure correlated directly to lower iodine uptake by the thyroid gland in both iodine-sufficient and iodine-deficient diets.<sup>19</sup> The toxicity of fluoride to the thyroid gland was also illustrated when researchers studied the Himalayan people in Nepal. They examined 648 subjects in low iodine areas and concluded that the areas with the highest fluoride levels in water (0.23ppm) had the highest incidence of goiter—nearly 70%.<sup>20</sup> Keep in mind that in the U.S. iodine levels have fallen substantially over the last 40 years. During this same time, most of the U.S. water supply has been fluoridated with fluoride levels averaging about 1ppm—which is substantially higher than the fluoride ingested in the Himalayan study.

Many commonly prescribed medications contain fluoride including the popular SSRI antidepressants such as Paxil and Prozac. Interestingly, there have been reports of this class of antidepressants increasing the risk of breast cancer.<sup>21</sup> Many medications that contain fluoride have been pulled from the market due to serious adverse effects. These include the cholesterol-lowering drug Baycol, Propulsid (for stomach ulcers), Posicor (anti-arrhythmic), Astemizole (allergies), Omnidex (antibiotic), Fen-Phen (weight loss) and many others. Fluoride is still used in many medications, as seen in [Table 9](#) on the next page. I believe that no medication should contain any toxic halogen, fluoride included. Interestingly, many fluoridated medications have been recalled due to an increased incidence of serious adverse effects.

**Table 9: Currently Used Fluorinated Medications**

Class of Medication	Common Names
Antacids	Prevacid
Anti-anxiety	Dalmane
Antidepressant	Prozac, Paxil, Celexa, Lexapro
Anti-fungal antibiotics	Diflucan
Non-steroidal anti-inflammatory	Celebrex, Cliniril
Steroids	Decadron, Flonase, Flovent, Advair Diskus

More information about the toxicity of fluoride can be found in the book, *The Devil's Poison* by Dean Murphy, DDS. This book is an excellent resource which chronicles the hazards of fluoride exposure.

### CHLORIDE

Chloride, like iodide, fluoride, and bromide is from the family of halogens. Chloride is an important element in the extracellular fluid. There is a large amount of chloride found in the body—approximately 100gm. Chlorine (the oxidized form of chloride) is added to many products including the municipal water supply as well as to swimming pools and hot tubs as a disinfectant. It is also used as a whitener. However, chlorine is a toxic element.

A byproduct of chlorine use is the production of dioxin. Dioxin is one of the most toxic carcinogens known to mankind. It does not readily break down in the environment. Chlorine and its byproducts have been linked to birth defects, cancer<sup>22</sup>, reproductive disorders including stillbirth,<sup>23</sup> and immune system breakdown.

Americans are exposed to a high level of chlorine and chlorine byproducts that are toxic to their health. This includes being exposed to the steam of the dishwasher when the door is opened after cleaning (chlorine superheated and combined with detergent). In addition, the widely used sugar-substitute Sucralose (Splenda®) contains chlorinated table sugar.

No one denies the importance of having clean drinking and swimming pool water that is free of bacteria. However, there are many safer alternatives to disinfecting water including the use of iodine, hydrogen peroxide, ultraviolet light, and ozone that could be substituted for chlorine.

### PERCHLORATE

Perchlorate consists of one atom of chlorine surrounded by four atoms of oxygen. It is found naturally in the environment and also can be man-made. Perchlorate can displace iodine binding in the body. It can damage the iodine transport mechanism (NIS).<sup>24</sup> Perchlorate, at low levels, has been found to cause thyroid cancer, goiter, hypothyroidism, and disruption of the normal menstrual cycle, as well as a weakening of the immune system.<sup>25</sup>

Perchlorate is used in a variety of products including car air bags, leather tanning, and fireworks. Today, one of the main manufacturing uses of perchlorate is for rocket fuel.

Sixty years ago, perchlorate was used as a medical treatment for hyperthyroidism as it can inhibit the thyroid gland's ability to

concentrate iodine. Without iodine, the thyroid gland will become inactive. In the 1960's, due to safety concerns, perchlorate use in medicine was discontinued.

Perchlorate exposure has been associated with many serious health conditions ([Table 10](#)). These conditions all relate to lowered iodine levels when there is excess perchlorate in the body.

**Table 10: Consequences of Perchlorate**

- Breast disease
- Hypothyroidism
- Immune System Problems
- Mental retardation in newborns
- Neurologic Problems
- Poor fetal development
- Poor neonatal development
- Thyroid cancer

Today, perchlorate still continues to cause significant health problems. Ground water is contaminated throughout much of the United States from manufactured perchlorate. Ninety percent of the perchlorate manufactured each year is used for rocket fuel for NASA, defense contractors and the Air Force.<sup>26</sup> Most perchlorate has been disposed directly into the ground or into abandoned mines.<sup>27 28</sup>

The entire lower Colorado River is contaminated with perchlorate. The lower Colorado River irrigates more than 1.8 million acres of land which encompasses over 15% of the nation's crops and 13% of the nation's livestock. Approximately 20 million Americans drink water from the Colorado River which is contaminated with perchlorate. In fact, at least 43 states have contaminated water from perchlorate.<sup>29</sup> When perchlorate is released into the water supply, it can persist for long periods of time.

Researchers compared thyroid function in newborns that live in an area (Yuma, Arizona) with perchlorate-contaminated drinking water supplied from the lower Colorado River versus newborns from an area (Flagstaff, Arizona) with non-contaminated drinking water. Rocket and missile facilities were thought to be the source of perchlorate that contaminated the water. Fifteen hundred infants were studied. The results showed that infants in Yuma were found to have significantly depressed thyroid function as compared to infants from Flagstaff.<sup>30</sup> Perchlorate levels were found to be elevated (above EPA limits) in the water supply in Yuma and undetectable in the water supply in Flagstaff.<sup>31</sup> Perchlorate is known to cross the placenta and can cause in-utero thyroid abnormalities.<sup>32</sup> Thyroid abnormalities in-utero or at birth are the leading cause of preventable mental retardation.<sup>33</sup>

Drinking water is not the only problem with perchlorate. Lettuce grown in the fall and winter months in the southwestern United States contains very high amounts of perchlorate. Up to 70% of the nation's fall and winter lettuce supply is irrigated with perchlorate-contaminated water from the lower Colorado River.

Over 130 samples of commercial lettuce were tested for perchlorate. This included head lettuce as well as adult and baby greens grown both organically and conventionally. Significant amounts of perchlorate were found in 83% of the lettuce samples tested. There was virtually no difference between organically or conventionally grown lettuce. It is estimated that by eating lettuce during the winter months, 1.6 million American women of childbearing age are exposed to more perchlorate than the EPA's recommended safe dose.<sup>34</sup>

Perchlorate has also been found in dairy and human milk. Forty-seven dairy milk samples from 11 states were examined for perchlorate. Significant amounts of perchlorate were found in 98% of the samples (46/47). Thirty-six human milk samples from 18 states were examined for perchlorate. All of the human milk samples—100%—were found to contain measurable amounts of perchlorate. The mean perchlorate level of human milk was 500% higher than dairy milk. In fact, there was an inverse correlation of perchlorate and iodide in breast milk; the higher the perchlorate level, the lower the iodide level. Breast milk is the only source of iodide in a breast-fed infant. The high perchlorate levels found in this study prompted the authors to conclude, "Recommended iodine intake by pregnant and lactating women may need to be revised upward."<sup>35</sup>

Perchlorate has also been shown to cause neurological problems in rats. The offspring of female pregnant rats exposed to perchlorate were found to have an irreversible decline in brain function.<sup>36</sup>

Remember, iodine levels have fallen over 50% in the United States over the last 40 years. Perchlorate is a more toxic substance when iodine deficiency is present. In fact, all the toxic halides are more toxic when iodine deficiency is present.

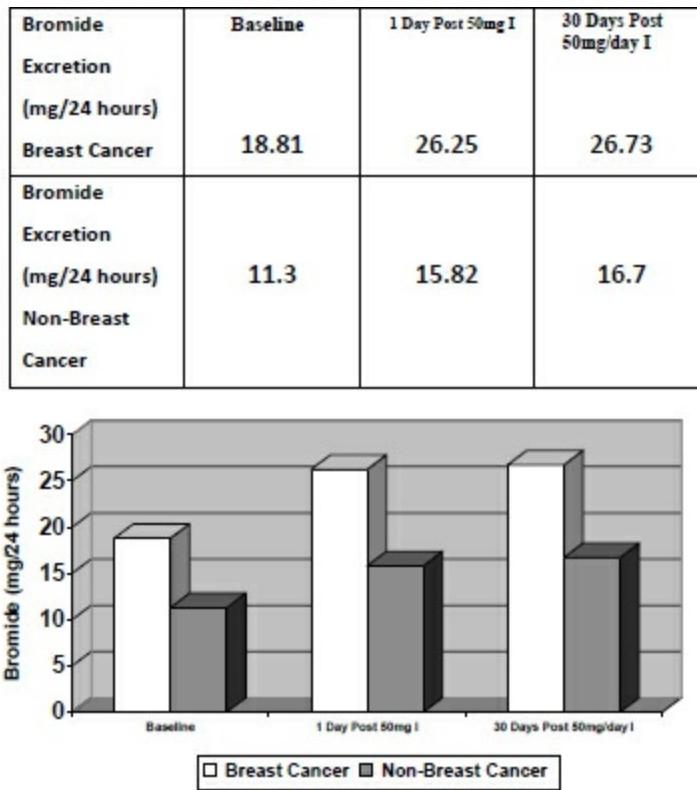
## **ARE THE TOXIC HALOGENS FLUORIDE AND BROMINE RESPONSIBLE FOR THE EPIDEMIC RISE IN BREAST CANCER?**

The research is clear that bromine and fluoride are toxic items for the body. In an iodine-deficient state, the toxicity of bromide and fluoride are exacerbated.

I undertook a study in my office to look at the difference in iodide, bromine, and fluoride levels in eight women with breast

cancer versus ten women without breast cancer. Urinary levels of bromine and fluoride were measured at baseline, one day after taking 50mg of iodine/iodide (Iodoral®) and 30 days after taking 50mg/day of iodine/iodide (Iodoral®). The results (seen above, [Figure 20](#)) shocked me.

**Figure 20: Average Bromide Excretion in 8 Breast Cancer and 10 Non-Breast Cancer Subjects**



Iodine levels were low in all of the women tested. This is not surprising because, as previously described in this book, iodine deficiency is occurring at an epidemic rate.

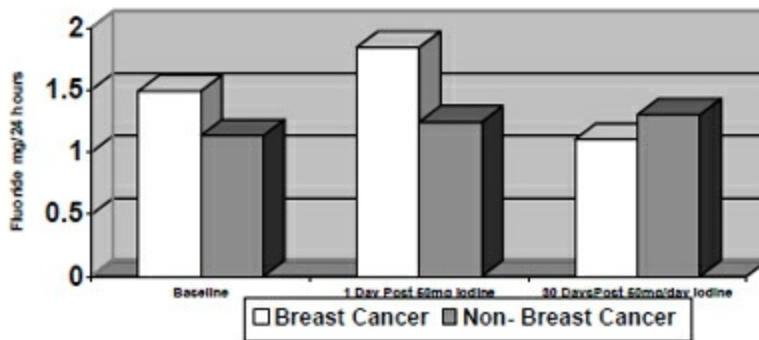
What shocked me was the difference in the levels of the toxic halogens bromide and fluoride. Bromide levels were found to be significantly elevated in the breast cancer versus the non-breast cancer subjects.

The fluoride testing ([Figure 21](#), next page) showed similar results, with the breast cancer subjects exhibiting higher fluoride levels as compared to the non-breast cancer subjects. Although the difference in the fluoride levels were not as dramatic as the bromide levels, this data shows that breast cancer patients are absorbing and retaining larger amounts of toxic halides as compared to non-breast cancer subjects. As previously mentioned, fluoride is a toxic halide that should be avoided. Its anti-cavity promotion is a seriously flawed idea that much of the Western world has rejected by removing fluoride from the water supply. Topical fluoride may have some practical applications when applied to the growing tooth—approximately from the age of 3-13. For adults, ingesting fluoride in our water supply in order to prevent caries is a fallacious concept. Fluoride does not prevent cavities and it interferes with hundreds of enzymes in the body and also causes thyroid dysfunction.

The way to reduce the body's burden of toxic halides is to increase the body's iodine levels. Remember, the toxicity of fluoride and bromine will be exacerbated in an iodine-deficient state.

**Figure 21: Fluoride Excretion in 8 Breast Cancer and 10 Non-Breast Cancer Subjects**

Fluoride Excretion (mg/24 hours) Breast Cancer	Baseline	1 Day Post 50mg I	30 Days Post 50mg/day I
<b>1.49</b>	<b>1.84</b>	<b>1.10</b>	
Fluoride Excretion (mg/24 hours) Non- Breast Cancer			
<b>1.13</b>	<b>1.24</b>	<b>1.30</b>	



The use of iodine supplementation, as part of a holistic nutritional program which facilitates the detoxification capabilities of the body, will allow the body to decrease its levels of toxic halides.

#### FINAL THOUGHTS

We are in the midst of a cancer epidemic. At the present time, one in three Americans will get cancer. Cancer is not caused by chemotherapy, radiation, or surgery deficiency. Cancer is a multifactorial illness that will only be conquered when the underlying causes of cancer are properly thought out and thoroughly dealt with.

There is no doubt that our exposure to toxic chemicals is increasing at the same time our nutrient status is declining. Is it any wonder that cancer rates are reaching epidemic proportions? Currently one in seven women (14%) has breast cancer and one in three men (33%) has prostate cancer. Iodine deficiency coupled with the increasing toxic load in our bodies could explain a great deal about why these cancer numbers are so high.

Iodine supplementation has multiple positive effects on the body. These positive effects are found in many different illnesses from fatigue states to autoimmune disorders and cancer. It is important not only to ensure adequate levels of nutrients in the body, but also to help the body utilize these nutrients by enhancing the detoxification mechanisms. Iodine supplementation will not only provide a valuable nutrient for the body, it will also aid in the detoxification process of the body. The next chapter will give you information about detoxification. I believe ensuring an adequate iodine level is a crucial factor to helping you achieve your optimal health.

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## Chapter 12

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### *Detoxification Questions and Answers*

## **CHAPTER 12: DETOXIFICATION QUESTION AND ANSWERS**

I have lectured extensively about iodine for over 12 years. After hearing my iodine lecture, the three most frequently asked questions are:

1. Why do I need to take so much iodine?
2. Why do I need more iodine now than people needed 100 years ago?
3. How do I detoxify from the toxic halides, bromine and fluoride?

This chapter will provide you with the answers to these questions.

### **WHY DO WE NEED TO TAKE SO MUCH IODINE?**

This is the most common question I am asked by both physicians and laypeople. The main reason we need to ingest more iodine is that the majority of people are iodine deficient, many of them severely iodine deficient. My experience has clearly shown that over 96% of my patients are low in iodine with most of them severely low. How can that be?

Over the last 40 years, iodine levels have fallen over 50%. There are a number of reasons this has occurred including the declining use of iodized salt.

If a lowered iodine intake was the only problem, it would be simple to rectify iodine deficiency with iodine supplementation. However, there is more to the story.

Currently, our exposure to the toxic halides—fluoride, bromide, and perchlorate—are occurring at levels that humans have never been exposed to. The consequence of this is a worsening of the already present iodine-deficiency problem.

We discussed the toxic halides in the previous chapter. These include bromine, fluoride, and chlorine derivatives. I have presently tested over 1,000 patients for their bromine levels. I have found that 100% of them have tested for high bromine levels. Fluoride in our water supply also adds to this problem. Only through iodine supplementation and detoxification can you reverse this problem. Detoxification will be covered at the end of this chapter.

### **WHY DO WE NEED MORE IODINE NOW THAN PEOPLE DID 100 YEARS AGO?**

Invariably, I am asked, “Why do we need more iodine than our predecessors took?” There are a number of factors that have led to the ‘perfect storm’ of iodine deficiency including:

1. Our food supply is remarkably deficient in iodine due, in part, to low salt intake.
2. The ingestion of brominated (instead of iodinated) bakery products leads to toxic levels of bromine in the vast majority of our population. Furthermore, brominated flour worsens an iodine-deficient condition.
3. Our continued exposure to brominated flame retardants in computers, furniture, clothing, bedding, and other common consumer materials.
4. Fluoridation of our water supply. Fluoridation is bound to worsen an iodine deficient problem by supplying a toxic halide on a continual basis.
5. The use of pesticides and insecticides for lawn care which contain toxic halides such as bromine and chlorine derivatives.
6. The use of many medications that contain bromine or fluorine as part of their chemical structure. A list of some of the brominated and fluoridated drugs is shown In [Chapter 11](#).

When you take into account these six items, it is no wonder that we need larger iodine doses than past generations of Americans. Unless our exposure to toxic halogens is decreased, we will continue to need and require larger amounts of iodine as compared to our predecessors. We need the larger iodine doses to help the body detoxify from the toxic halogens.

### **HOW TO DETOXIFY FROM THE TOXIC HALIDES**

Now that we have established that there is no use in our body for the toxic halides, I will show you four safe and simple steps to help you detoxify from these toxic substances.

#### **Step 1: Ensure Adequate Hydration**

It is impossible to detoxify from any substance without maintaining adequate hydration. Water can not only bring nutrients to the tissues of the body, it can help flush out toxins. My experience has shown that maintaining adequate hydration is the single most important health factor in any detoxification program. How much water should you drink? A rough estimate is to take your weight in pounds, divide by 2 and the resultant number is the amount of water you should drink in ounces per day. It is important to drink clean water, free of fluoride and chlorine derivatives. Reverse osmosis water is one such example. It is important to

ensure that you have adequate mineral intake when drinking reverse osmosis water. How can you ensure adequate mineral intake when drinking reverse osmosis water? Simply add unrefined salt to the water—see Step 2.

### **Step 2: Ingest Unrefined Salt**

As previously mentioned, unrefined salt helps to rid the body of the toxic halide bromine. How is this accomplished? Chloride and bromide, part of the halogen family, are next to each other on the periodic table. Chloride is an effective competitive inhibitor of bromide. I have found it impossible to lower bromine levels in my patients if they do not ingest unrefined salt. I suggest taking approximately 1-1.5tsp/day of unrefined salt. For more information about unrefined salt, I refer the reader to my book, Salt Your Way To Health.

### **Step 3: Take Antioxidants**

Vitamin C can act as a potent antioxidant for both the fat and water-soluble tissues. Vitamin C can also help stimulate the detoxification pathways of the body. I suggest taking 3000-6,000mg of vitamin C/day. If you get diarrhea, lower the dose.

Selenium is a potent antioxidant. Our food supply is very deficient in selenium. Taking 100-200 $\mu$ g/day of selenium can help the antioxidant status of the body and may improve thyroid functioning.

### **Step 4: Supplement With Iodine**

Iodine will help the body release the toxic halides. My experience has shown that this effect only occurs with larger (mg) doses of iodine. Generally, a dose from 12-50mg/day is effective for most people. Those with serious illnesses such as breast or prostate cancer may need more. As the toxic halides are released, you may experience a detoxification reaction. This can include headaches, fatigue, muscle aches, and palpitations. To minimize detoxification reactions, you can do Steps 1-3 for two weeks before instituting iodine therapy.

Remember, the best results are achieved when you work with a health care practitioner knowledgeable about iodine and the detoxification pathways. If you experience problems, please seek advice.

### **FINAL THOUGHTS**

This chapter was written to answer the most common questions I am asked by both doctors and laypeople. The vast majority of our population is being exposed to ever-increasing amounts of toxic halides and decreasing amounts of iodine. Is it any wonder that iodine-deficient illnesses such as endocrine-related cancers (thyroid, breast, prostate, uterus, and ovary) as well as thyroid problems (hypothyroidism, Hashimoto's, and Graves' disease) are increasing at near epidemic rates? I believe the only solution to these common problems is to ensure adequate iodine intake in order to enable the body to competitively inhibit and detoxify the toxic halides.

However, keep in mind, iodine is best used as part of a holistic treatment regimen that includes the use of unrefined salt and antioxidants such as vitamin C.

## Chapter 13

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### Iodine Dosage Guidelines

## CHAPTER 13: IODINE DOSAGE GUIDELINES

Now that we have established that the RDA for iodine (approximately 150 $\mu\text{g}/\text{day}$ ) is inadequate, how much iodine should you take? There is some concern in the conventional literature that too much iodine can harm the thyroid gland and cause other problems in the body. This chapter will explore how to safely use iodine to achieve your optimal health.

The question of dosage cannot be answered without reviewing the iodine intake of the Japanese. It has been estimated that the mainland Japanese ingest approximately 13.8mg of iodine per day, which is approximately 100 times the RDA.<sup>1</sup> The Japanese receive most of their iodine from seaweed, which is known to concentrate iodine.

What is the effect of ingesting this larger amount of iodine? The Japanese who consume these large amounts (by U.S. RDA standards) of iodine have remarkably lower levels of breast, endometrial, and ovarian cancers. In addition, as compared to American women, there is a significantly lower amount of fibrocystic breast disease in Japanese women. Mainland Japanese men have a significantly lower rate of prostate cancer as compared to the U.S. male population including Japanese males who have migrated to the United States. The medical literature has pointed out a possible relationship between all of these cancers and iodine deficiency.

### SEVEN CONCERNS WITH USING HIGH LEVELS OF IODINE

There is some concern that the ingestion of iodine in excess of the RDA—150 $\mu\text{g}/\text{day}$ —will cause adverse effects. I will show you that with the proper monitoring and dosing, iodine in milligram doses is safe and effective. There are seven major concerns with using iodine in excess of the RDA. Many iodophobic individuals feel that milligram doses of iodine may cause:

1. Iodine allergy
2. Autoimmune thyroid disease
3. Detoxification reactions
4. Iodine-induced hypothyroidism and goiter
5. Iodine-induced hyperthyroidism
6. Iodism
7. Thyroid cancer

### ALLERGY TO IODINE

In my experience, an allergy to inorganic iodine/iodide is a rare occurrence. An allergy to radioactive iodine dye, commonly used in many medical imaging procedures, does not guarantee that there is an allergy to inorganic iodine/iodide—such as in Lugol's or tableted Lugol's. In fact, my experience has shown that it is a rare occurrence to have an allergy to inorganic iodine/iodide. During twenty years of practice, I have seen three patients with an allergy to inorganic, non-radioactive iodine.

An allergy can take any form, including a rash, fatigue, congestion, headache, and fever. NAET, an acupressure technique, has been useful in some of my patients to help them overcome an allergy to iodine. More information on NAET can be found in the Appendix.

*Joan, age 62, suffered from hypothyroidism for 20 years. Although Joan's symptoms improved on a holistic treatment plan (detoxification, vitamins and minerals, and dietary changes), she still was not feeling like she wanted to feel. When she was diagnosed with an iodine deficiency, I recommended that she supplement with iodine. Joan was given an iodide/iodine supplement (Iodoral®) and immediately felt better. "It was like waking up from a nap. Within one week, my head felt clearer and my energy level improved. I have a busy job and I was having trouble keeping up with it," she said. Approximately two weeks after starting Iodoral®, Joan called me complaining of a rash on her body. I told her to stop the iodine immediately. Joan told me, "I don't want to stop it. This is the first time in years that I have felt wonderful." I had Joan come into the office and treated her with NAET. Joan's allergy symptoms abated within 24 hours and she is currently taking iodine without any problems. She continues to feel well today.*

### AUTOIMMUNE THYROID DISEASE

Some researchers and endocrinologists believe that autoimmune thyroid problems are caused by iodine intake in excess of the RDA. However, before the adoption of radioactive iodine to treat the side effects of autoimmune thyroid illnesses, the use of higher doses of iodine was the treatment of choice for these illnesses. There are numerous reports in the literature, some dating back well over 100 years, showing the benefits of using iodine in excess of the RDA to treat autoimmune thyroid illnesses.<sup>2 3 4 5</sup> Chapters 4–6 point out that autoimmune thyroid disorders are associated with low iodine levels, not high levels.

As previously stated, in the United States, iodine levels have fallen more than 50% over the last 40 years while, at the same time, autoimmune thyroid disorders have been rapidly increasing.<sup>6</sup> If iodine was the cause of autoimmune thyroid illnesses, these illnesses should have been decreasing over the last 40 years. The opposite has occurred.

My clinical experience has shown that in an iodine deficient state, higher doses of iodine are an effective and safe way to treat autoimmune thyroid illness without appreciable side effects. Remember, the best results are achieved as part of a comprehensive holistic treatment plan.

It is important to restate this: My partners and I have not seen AIT disease caused by iodine supplementation. On the contrary, it is iodine deficiency that causes AIT disease.

## DETOXIFICATION REACTIONS

In [Chapter 11](#), it was established that iodine could compete with the toxic halides, bromide and fluoride. The study I undertook showed that the use of iodine resulted in the release of the toxic halides from the body. If the body's detoxification pathways are overloaded when the toxic halides are being released, a detoxification reaction can be triggered. A detoxification reaction can take the form of fatigue, muscle aches, fever, diarrhea, and brain fog, among others.

A detoxification reaction to iodine usage does happen--about 5% of the time. A detoxification reaction can be minimized by using a comprehensive holistic treatment program including: nutritional support (vitamins and minerals), balancing the hormonal system, getting the body's pH balanced, eating healthy foods, and other holistic treatments. One of the best ways to minimize a detoxification reaction is to ensure adequate use of unrefined salt as well as supplementation with magnesium and vitamin C.

## IODINE-INDUCED HYPOTHYROIDISM AND GOITER

When animals or humans that are iodine deficient are given large doses of iodine, there is a transient decrease in thyroid hormone production (approximately 26-40 hours) until the body reestablishes its equilibrium with iodine.<sup>7 8</sup> After that time, thyroid levels adjust to normal and signs of hypothyroidism do not develop.

Many researchers point out the dangers of iodine by describing the goiter problems of the residents of Hokkaido, Japan. A report in 1960 described how a significant portion of the population of Hokkaido, Japan had developed goiter. Goiters were more common in seaweed fishermen and in villages where seaweed was eaten in large quantities. The residents of Hokkaido, as well as other areas of Japan, were found to be ingesting large amounts of iodine. The Japanese authors did not think that iodine was the causative factor of the goiters since residents of inland areas had the same iodine intake as the residents in Hokkaido, and they had no signs of increased goiter. Clearly, some other factor must have been involved. However, many Western physicians seized on the Hokkaido data and erroneously claimed that excess iodine ingestion was the cause of the rise in the goiter rate. Some still make this ridiculous assertion today. Although no testing was done, goitrogens (such as bromide) could have caused the elevated goiter picture. A follow-up study 27 years later found a similar iodine intake in Hokkaido residents but no signs of excess goiter, therefore ruling out iodine as the cause.

I have spoken with other doctors who have used higher doses of iodine in the treatment of their patients; they also report no increase in hypothyroid or goiter problems.<sup>9</sup> More about this concept will be discussed in [Chapter 16](#).

## IODINE-INDUCED HYPERTHYROIDISM

The use of iodine in a previously iodine-deficient population may result in a transient increase in thyroid hormones. Studies have shown that the increase in thyroid hormones, which could lead to hyperthyroid symptoms (e.g., palpitations, nervousness), will gradually decrease.<sup>10</sup> These side effects can easily be monitored by routine lab tests and adjustments in dosages. Also, ensuring adequate amounts of unrefined salt minimizes any side effects from iodine supplementation.

Researchers from Switzerland found that the correction of iodine deficiency not only decreased the incidence of thyrotoxicosis, it also lowered the incidence of goiter, cretinism, and minor deficiencies of intellect.<sup>11</sup> My experience has shown that iodine-induced hyperthyroidism is not a common occurrence.

## IODISM

Iodism occurs when the dose of iodine is too high and results in a metallic taste in the mouth, increased salivation, sneezing, headache, and acne. Also, sinus headache, especially headache in the frontal area, and a sense of fever may be present. Iodism occurs in a small minority of patients and is easily rectified by adjusting the dosage of iodine used.

Dr. Sherry Tenpenny claims that chlorophyll tablets will eliminate the metallic taste of iodine. Dr. Flechas has reported similar results with chlorophyll. I have found that unrefined salt and vitamin C powder also minimizes iodism.

## THYROID CANCER

Thyroid cancers are a small minority of cancers in the United States representing 1% of all cancers.<sup>12</sup> Women are affected in larger numbers than men, approximately 3:1.

There have been some reports in the literature that iodine supplementation can be associated with an increased incidence of thyroid papillary cancer.<sup>13</sup> If iodine usage were the cause of thyroid cancer, then the falling iodine levels would be expected to lead to lowered thyroid cancer levels. However, this has not been the case. During the past several decades, when iodine levels have declined, the incidence of thyroid cancer has markedly increased.<sup>14</sup> Perhaps iodine deficiency is the cause of the elevation in thyroid cancers.

Iodine supplementation has been shown to significantly improve the prognosis of thyroid cancer by shifting the type of cancer

to a more easily treatable (i.e., differentiated) form.<sup>15</sup>

Radiation exposure has been positively correlated with thyroid cancer for more than 50 years. Over the years, numerous studies have confirmed this link, including the problems at Chernobyl. One of the treatments for exposure to radiation is iodine. Potassium iodide was given to residents of Poland and Russia after the Chernobyl accident and has been hailed as a success in preventing more cases of thyroid cancer.

In an iodine-deficient state, when exposed to radioactive iodine (such as in Chernobyl), the thyroid gland will absorb large amounts of the radioactive iodine. This will lead to thyroid cancer. However, if the thyroid gland is saturated with iodine, radioactive iodine will be absorbed in much smaller amounts and the problems with thyroid cancer will be lessened.

As compared to the people surrounding Chernobyl, I predict the Japanese will have less adverse effects from the Fukushima disaster because the Japanese, as a population, have a higher iodine intake.

It makes perfect sense to have the body sufficient with iodine before being subjected to a toxic exposure of radioactive iodine.

## HOW MUCH IODINE SHOULD YOU TAKE?

Now we are back to the question above. There is no perfect dose for everyone. The best way to properly dose iodine is to test the body for its iodine status. This can easily be accomplished with an iodine-loading test. The instructions for the loading test are detailed below.

### Iodine-Loading Test

1. First morning urine is discarded.
2. Take 50mg of iodine/iodide (Iodoral®) with a glass of water.
3. Collect 24-hour urine. Include the first morning sample at the end of the 24-hour collection.
4. Send a sample of the 24-hour urine for evaluation of iodine status.

The principle behind using the iodine-loading test has been well established. If the body was saturated with iodine, one would expect that most of the 50mg of iodine ingested for the loading test would be excreted. If, on the other hand, there was an iodine deficiency present, then more of the iodine would be absorbed.

Research has shown that a 90% excretion (or 45mg of iodine) of a 50mg iodine-loading test would indicate an iodine-sufficient state. Levels below 90% (or <45mg) would indicate an iodine-deficient state. In this case, iodine supplementation can begin and retesting can be performed in the future. To find out more about iodine testing, I refer the reader to FFP Labs or Hakala Labs (see Appendix).

Once an iodine-deficient state is determined, iodine supplementation can be implemented. I recommend using a combination of iodine and iodide. This can be found in liquid or tablet form. The Appendix will provide you more information on how to find an iodine supplement.

[Chapter 1](#) established that iodine concentrates in all of the trillions of cells in the body. Not only does it concentrate in the thyroid and breasts, it also accumulates in the prostate, salivary glands, skin, intestines, and all the red and white blood cells throughout the body. Proper iodine supplementation needs to address all of these issues. Approximately 12mg of iodine has been established as the optimal daily dose of iodine/iodide for the breast and thyroid gland. However, this may not be adequate to address the needs of the rest of the body.

Also, due to the contact with so many goitrogenic substances such as bromide, fluoride, and chlorine, the daily iodine requirements may be elevated for some. Depending on the iodine status of the body, my experience has shown that the RDA for iodine—150 $\mu$ g/day—is inadequate not only for the thyroid gland, but for the rest of the body as well.

We live in a toxic society, and are continually exposed to increasing amounts of goitrogens in our environment. The increased toxic load and goitrogen exposure will necessitate an increased ingestion of iodine. Although the dose should be individualized, my experience has shown that the dose can vary from 12-50mg/day for most adults. This is the daily dose that Dr. Guy Abraham, my mentor on iodine, recommended. Some may need higher doses, particularly those with cancer or disease of the thyroid, ovaries, uterus, breast, and prostate. This higher iodine dose can easily be followed by periodically checking an iodine-loading test. A proper history and physical exam can also help guide dosing of iodine.

If using Lugol's solution, keep in mind that 2 drops provides 12.5mg of a combination of iodine and iodide.

## IS IODINE SAFE DURING PREGNANCY?

The World Health Organization claims that iodine deficiency is the world's greatest single cause of preventable mental retardation. In the United States, iodine levels have fallen over 50% during the last 40 years.<sup>16</sup> Recent studies show that nearly 60% of U.S. women of childbearing age are deficient in iodine.<sup>17</sup> [Chapter 2](#) reviewed the reasons why iodine levels are falling.

The consequences of iodine deficiency during pregnancy are severe. For the fetus, iodine deficiency can result in neurologic deficiencies and a lowered IQ. The worst case scenario is death. Iodine deficiency during pregnancy has been associated with other illnesses in neonates and children including cretinism, dwarfism, depression, and ADHD. Researchers have shown that

neonatal mortality declines over 50% when iodine deficiency is rectified. It is important to ensure that a woman has adequate iodine intake before she becomes pregnant.

Researchers at the University of Texas have reported their concern about iodine deficiency during pregnancy. "I think it is quite likely we've had subtle neurological deficiencies in babies born in the U.S. (to mothers with iodine deficiencies)," claimed one scientist.<sup>18</sup> The same researchers have called on the U.S. government to boost Americans' iodine intake.

Japanese women are estimated to ingest a minimum of 12mg of iodine per day—nearly 100x the RDA for iodine in the U.S. This amount of iodine has not resulted in widespread reports of problems to Japanese newborn babies. In fact, the Japanese have a much lower infant mortality rate as compared to the U.S.

It is vital to ensure that women of childbearing age ingest sufficient amounts of iodine. How much iodine is this? No one truly knows the answer. Proper testing and monitoring of iodine levels can help answer this question.

However, since Japanese women ingest a minimum of 12mg of iodine/day without reports of adverse effects, this may be a starting dose for women of childbearing age. My experience has shown this dose to be extremely safe. If you are pregnant, I do not suggest adding iodine to your regimen without consulting your doctor. Remember, the best results with any therapy will be obtained by working with an iodine-knowledgeable healthcare practitioner.

### SALIVA/SERUM IODIDE LEVELS

When iodine is taken orally, it is absorbed into the bloodstream. Iodine is transported into the target cells of the body by an energy-dependent process. One atom of iodine is transported into the cells and two atoms of sodium are transported out of cells via the sodium/iodide symporter (NIS).<sup>19 20</sup> Recently a second mechanism for transport of iodine into the cells has been observed—the chloride/iodide transporter known as pendrin.<sup>21</sup>

Iodine may be absorbed through the intestines resulting in an elevated serum level of iodine, but the target cells are unable to uptake the iodine. This can occur if the NIS and/or the pendrin transporter systems are damaged. Certain goitrogens, such as bromide, can bind to the NIS causing damage to the transport system. The end result of this damage would be iodine deficiency in the target cell. Dr. Abraham and I reported a case history of my nurse, Denise, who had a transport defect of iodine.<sup>22</sup>

Upon taking iodine orally, the iodine is absorbed in the intestine. As serum levels of iodine increase, iodine is transported into the target cells via the NIS or pendrin. One way to determine if the transport mechanism for iodine is working is by measuring the saliva/serum iodide ratio. If the transport mechanisms for iodine are properly functioning, the saliva levels of iodine will significantly increase relative to the serum. A saliva/serum iodide level has been used in neonates to diagnose a congenital iodide symporter defect.<sup>23</sup>

We (Drs. Abraham, Brownstein, and Flechas) have been evaluating saliva/serum iodide levels in a series of patients. Initial results show that the normal saliva/serum iodide level is approximately 42. That means that when iodine is being properly transported into the cells, the salivary fluid should have 42 times the iodine level that is found in the serum. If the saliva/serum levels are low, especially less than 20, a thorough search for a reason for the poor transport of iodine must be undertaken.

Goitrogens can bind to and damage the NIS and result in a lowered amount of iodine being transported into the target cell.<sup>24</sup> Examples of these goitrogens include: fluoride, perchlorate, bromine, and thiocyanate (from cigarette smoke). In the near-future, saliva/serum iodine levels will be used to diagnose an iodine transport defect.

*Bob, a 42-year-old accountant, had been taking 12.5mg of iodine/iodide for two years. Bob could not tell a difference upon taking the iodine. Although he generally felt well, he complained of being fatigued. His initial salivary/serum level was low at 9.3. Bob's testing also showed that his serum bromide levels were elevated—147mg/L (normal <5mg/L). I increased Bob's iodine dosage to 50mg/day. Immediately, he felt a boost in his energy. "I thought I was feeling pretty good until I increased the iodine. Then I really felt good. After work I wasn't so exhausted," he said. Bob's follow-up testing showed that his salivary/serum iodide levels improved to a healthier 48.6 and his bromine level fell to 28.7mg/L.*

Bromine is a toxic halide that has no known therapeutic value in the human body. Bromine, being part of the halide family (along with iodine and fluoride) can not only compete and bind to the iodine receptors in the body, it can also damage the NIS and block the target cells' ability to absorb iodine. Due to our increasing exposure to the toxic halogens (i.e., bromine and fluoride), as well as our exposure to other goitrogens (perchlorate, thiocyanate, etc.), our need for iodine has actually increased. In Bob's case, a higher iodine intake was able to help his body overcome the bromine toxicity that was present.

We (Drs. Abraham and Brownstein) have reported on the repair of an iodine transport defect with the use of vitamin C and unrefined sea salt (Celtic Sea Salt®).<sup>25</sup> This case study provides evidence that the damage to the iodine transport mechanism can be repaired with a complete nutritional program.

### FINAL THOUGHTS

Iodine, like any substance, can cause adverse effects (mentioned above). For individuals who are unusually sensitive to supplements and medications, I would recommend starting with a low dose of iodine and titrating the dose upward. Close monitoring of the symptoms can often guide the dosage.

It is vitally important that pregnant women and women of childbearing age ingest sufficient amounts of iodine before they become pregnant. Compared to iodine deficiency, an adequate intake of iodine improves IQ and decreases neonatal mortality.

To lessen side effects, iodine supplementation is more effective when it is given as part of a complete nutritional program. My clinical experience has shown that balancing vitamins, minerals, and hormones along with iodine supplementation provides a better result as compared to using iodine as a single agent.

The average iodine dosage that I have found to be the most effective ranges from 12-50mg/day. Those with disease of the glands (e.g., breast or thyroid) may need more. To get the best results, it is best to work with an iodine-knowledgeable health care provider.

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## Chapter 14

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### Case Histories

## CHAPTER 14: CASE HISTORIES

This chapter will contain several case histories that will illustrate how iodine deficiency is recognized and treated. It will also provide the practitioner with information on how to approach the patient with iodine deficiency.

*I am a Physician's Assistant in a primary care practice. I attended a conference in 2006 where Dr. Brownstein lectured on iodine and thyroid disease. When I returned home, I placed my husband, myself, and my three children on iodine. The results were nothing short of amazing, as we are all remarkably better. My oldest daughter, Randi, experienced the most profound improvements. In her early teen years, she experienced depression, weight gain, and she became bulimic. Randi seemed to get sick easily and had frequent sinus infections. When she became 18 years old, she received a nice scholarship to a wonderful university. She was often sick during her first semester. Randi went to see a counselor after missing several classes and upon questioning her, the counselor thought she was suicidal. She was admitted to a local hospital psychiatric ward and was placed on several medications. Randi's psychiatrist had her on seven different medications and she could not function normally. She also continued to be bulimic despite counseling. We decided to take her off all of the medications. I sent her to a doctor who prescribed natural progesterone which helped.*

*When I returned from Dr. Brownstein's conference and placed Randi on iodine (Iodoral®), we saw another improvement. She immediately started thinking clearer and her energy level dramatically increased. Randi was able to sleep better at night and her allergies improved. After witnessing the incredible positive improvement in her health from supplementing with iodine, I now realized that my focus should be looking at optimizing Randi's thyroid function. Many of my family members, including myself, have a history of thyroid problems. I found Randi to have an elevated TSH level (6.0mIU/L—normal levels 0.2-4.7mIU/L). She is now seeing a physician in Atlanta who has placed her on desiccated thyroid.*

*The change in my daughter has been amazing. Her face has slimmed down, she is not chronically depressed, and her hair is not falling out. She says she can eat like a normal person and told me the other day that she is no longer bulimic. Her acne has also resolved, as has the swelling in her ankles. She is not on any prescription medications except for progesterone and thyroid and she takes her Iodoral® faithfully. I believe that the iodine therapy was the catalyst for helping my daughter overcome her serious health issues.*

Randi's case is not unique. I have seen many psychiatric issues resolve when iodine deficiency is rectified. Perhaps psychiatrists should investigate iodine levels before reflexively putting patients on mood-altering medications.

*Betty is an 82-year-old female who has a twenty-five year history of thyroid nodules and intermittent hyperthyroid symptoms. Betty was advised to receive radioactive iodine to treat her condition, but she refused. As explained in [Chapter 6](#), radioactive iodine does not treat any underlying cause of a thyroid illness. I believe that radioactive iodine should be the last choice in treating any thyroid disorder.*

*Betty was given an iodine-loading test with 50mg of iodine/iodide (Iodoral®). Her initial iodine-loading test showed a very low iodine excretion with a 35% excretion measured (normal >90%). Betty's initial thyroid ultrasound showed an enlarged thyroid gland with a total volume of 13.1ml. She also had large nodules in both the right and left lobes of the thyroid gland.*

*Betty was placed on 50mg/day of iodine/iodide (Iodoral®). Betty was also treated with vitamin C, unrefined sea salt (Celtic Sea Salt®) and magnesium. The vitamin C can function as an antioxidant and can help support the body's detoxification pathways. Celtic Sea Salt® can supply the body with chloride which aids in detoxifying toxic halides (bromide and fluoride). Celtic Sea Salt® is also a good source of minerals. Magnesium is a relaxing agent for the body and can help prevent hyperthyroid symptoms caused by a detoxification of toxic halides.*

*After two months of taking 50mg/day of iodine/iodide (Iodoral®), Betty felt much better. Her energy improved and she felt that her brain fog had resolved. A repeat thyroid ultrasound showed the size of the thyroid gland decreased to 10.3ml—a 22% decline. In addition, all of the nodules were noted to be smaller from the previous ultrasound. Betty's thyroid levels were unchanged from taking 50mg of iodine.*

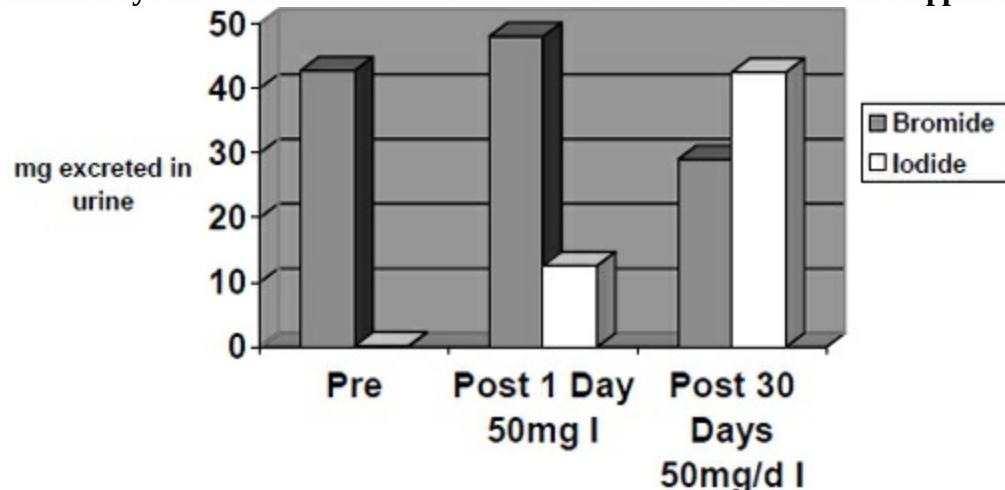
*Update on Betty's case: Betty is still taking iodine and still doing well. On physical exam, her thyroid continues to decrease in size.*

*New (5<sup>th</sup> Edition) update on Betty's case: Betty continues to supplement with iodine. Betty's follow-up thyroid ultrasound is now read as normal. When I told her I was writing a new edition to this book, she said, "Make sure you put in there how much better I am feeling."*

*Before the usage of iodine/iodide in milligram doses, it was rare to see thyroid nodules and a hypertrophied thyroid gland shrink in size. Now it is common in my practice. Only with the proper dose of iodine/iodide (in mg doses) have I found thyroid nodules to recede.*

David is a 48-year-old health club owner. David was diagnosed with thyroid cancer ten years ago and had a thyroidectomy followed by chemotherapy. He was placed on Synthroid® and had his dose of Synthroid® titrated until his thyroid levels showed a euthyroid state. However, after the surgery, David gained 50 pounds of weight and never felt the same. “I exercised all the time and I couldn’t lose an ounce. It did not matter whether I ate or not. I kept telling my doctors that I did not feel right—I was always tired and I couldn’t think straight,” he said. When I saw David, his physical exam showed a slight edematous feeling around the lower neck in the area of his thyroidectomy. David claimed, “I always told my doctor that I felt something around my neck. They kept telling me that nothing was there since I had my thyroid removed.” An iodine-loading test showed David was extremely low in iodine—he had one of the lowest loading tests that I have seen—0.3% excretion (normal >90%). David was also found to be excreting large amounts of the toxic halide bromide (see figure on next page). Bromide is a toxic element and no bromide should be present in the body. David was started on 50mg of iodine/iodide (Iodoral®), and his iodine and bromide levels were reevaluated at 1 day and 30 days. His results are seen in the figure below. Due to the large amounts of bromide, David was treated with a holistic regimen designed to support his detoxification pathways. This included vitamin C, unrefined salt (Celtic Sea Salt®), and liver support. Two months later he reported, “My brain fog cleared and I began to lose weight for the first time since the surgery. It is a miracle.” Also, the edema around the lower neck resolved and David no longer felt as if his neck was being squeezed.

#### Case History David: Iodide/Bromide Levels Before and After Iodine Supplementation



*Update on David’s case: David is still taking iodine. His bromide levels have now started to decline. All swelling of the thyroid gland is gone.*

*New (5<sup>th</sup> Edition) update on David’s case: David continues to feel well. He recently stated at a routine office visit, “I am still amazed at how much better I feel with iodine. I can’t understand why more doctors aren’t prescribing it.”*

Iodine deficiency is associated with hypertrophy of the thyroid gland as well as hyperplasia of the thyroid gland. Oftentimes, when there is iodine deficiency present, the physical exam will reveal an edematous feeling in the thyroid area of the neck, often like there are “cotton balls” surrounding the thyroid gland. Patients will often report to me that they have a swollen feeling of the thyroid gland. Most times, when iodine deficiency is rectified, the edematous feeling will resolve. The treatment for thyroid cancer must include identifying and treating the underlying cause(s) of the illness. The conventional approach to thyroid cancer relies on the use of surgery, chemotherapy, and radiation. However, thyroid cancer does not develop because of a deficiency of thyroid surgery, radiation, or chemotherapy. A treatment can only be effective if it treats the underlying cause of the condition. Research has shown that iodine can induce apoptosis (programmed cell death) of thyroid cancer cells.<sup>1</sup>

As stated previously, there is no doubt that iodine deficiency plays a large role in the development of thyroid cancer (as well as other cancers). Only with rectifying iodine deficiency, coupled with a comprehensive treatment plan that emphasizes optimizing the function of the immune system, will people be able to prevent and overcome these serious disorders.

*Janice, a 52-year-old nurse (my nurse) was complaining of intermittent fatigue and muscle aches. At the beginning of our work day, I could tell how Janice was feeling by the way she walked down the hall. If she was feeling well, she had a bounce in her step. If she was feeling down, she would have a slight slouch to her body and slowness in her step. Usually by the end of a busy day, Janice would be extremely fatigued and complain of muscle and joint pain. “Sometimes my feet and legs would just be killing me by the end of the day,” she said. Janice was very sensitive to all medications and supplements. She frequently took children’s doses of items because she had such a sensitive system. She did not want to do an iodine loading test because she feared taking the loading dose of iodine—50mg. I elected to therapeutically treat*

her with 12.5mg of iodine/iodide (*Iodoral*<sup>®</sup>). Immediately, she felt better. “All of my pain was gone in three days. After two weeks, my energy zoomed higher. I was no longer aching at the end of the work day; I felt great,” she claimed. After four weeks of taking 12.5mg *Iodoral*<sup>®</sup>/day, she developed mild palpitations. I told her to stop the iodine and the palpitations subsided one day later. Janice was instructed to take 12.5mg *Iodoral*<sup>®</sup> three days per week. In addition, she was placed on a vitamin and mineral regimen. Janice did well for the next five months until one day at work I saw her limping down the hall. I asked her why she was limping and she told me, “I feel terrible. Everything aches and my feet are killing me.” When I asked her if she was taking the iodine, she told me that she quit it one week ago. Incredulously, I asked her “why?” She told me that she thought she had enough in her body. After a few terse comments, I instructed her to resume the iodine dose. By the time Janice had taken her third iodine dose, all of her symptoms again resolved.

Update on Janice’s case: Janice never misses an iodine dose now. “I learned my lesson. It truly made a huge difference in my life. I know I would not feel well without it,” she said.

Shirley, at 69-years-old, is very sensitive to medications and supplements. She also happens to be my mother-in-law. Shirley was on 6.25mg/day of iodine/iodide (*Iodoral*<sup>®</sup>) to help treat many hypothyroid symptoms including cold extremities, hair loss, dry skin, and fatigue. All of her symptoms improved significantly with the iodine supplementation. Furthermore, she was able to stop taking thyroid hormone due to the positive effects of the iodine. Approximately four months after starting the iodine regimen, Shirley developed palpitations. Now, having your mother-in-law develop palpitations is not a good thing. The palpitations ceased after two days without the iodine. Shirley was instructed to take microgram doses of iodine in the form of *Atomidine*<sup>®</sup> (Edgar Cayce’s iodine formulation) three days per week. Since reducing her dose, all of her hypothyroid symptoms have improved and she is not having palpitations. Shirley’s case is very rare. I have only had to use microgram amounts of iodine a few times over the last 12 years. This has occurred in patients who are extremely sensitive to nearly everything.

The above cases illustrate that every patient needs to have an individualized treatment plan. Those that are sensitive to medications may need a lowered dose, and may need to titrate their dose of iodine. If one is deficient in iodine, it is rare not to be able to find an appropriate dose to improve the clinical condition.

Amanda, a 23-year-old fitness instructor, complained of coldness of her extremities and fatigue. “I teach four aerobic classes per day and I am exhausted after each class,” she said. Amanda’s saliva/serum of iodide could not be calculated since her iodine level was too low. In addition, she was found to have a large amount of bromide in her serum (127mg/L). As established in [Chapter 11](#), bromide is a toxic halogen that inhibits iodine absorption and binding in the body. Amanda was started on 25mg/day of iodine/iodide (*Iodoral*<sup>®</sup>). Immediately, her symptoms improved. “I was not exhausted after teaching my aerobics class. Also, my hands and feet warmed up,” she said. Amanda was also complaining of a rash on her skin after teaching a pool aerobics class. The pool was sanitized with bromine. After taking the iodine, the rash immediately disappeared. Follow-up testing revealed that Amanda’s saliva/serum iodide improved to 42.5 and her serum bromine level fell to 16.7mg/L.

Update on Amanda’s case: Amanda has now been on iodine for three years. “I would not stop taking it because it makes me feel so good. The biggest difference I have found is that my energy level declines when I go a few days without iodine,” she said.

New (5<sup>th</sup> Edition) update on Amanda’s case: Amanda continues to take 25mg/day of iodine. She has had her first baby and took the same dose of iodine throughout her pregnancy. Amanda recently reported to me, “Of all the things I have taken over the years, iodine is the best. If I miss taking it for a few days, I start to get puffy and my energy drops. My body will tell me when I forget to take iodine. I never want to stop taking it.”

Amanda’s case is very common. The correction of iodine deficiency can resolve the symptoms of hypothyroidism. In fact, if there is iodine deficiency and hypothyroidism present, iodine deficiency needs to be corrected first. This was explained in [Chapter 6](#). In Amanda’s case, correcting an iodine deficit was probably helping the body rid itself of the toxic halide bromine. The improvement in her skin was evidence of this.

Kim, a 42-year-old business woman, wanted desperately to have another child. She said, “My son is 11 and I want him to have a brother or sister.” Kim had two miscarriages over the last two years and she had a difficult time getting pregnant. Her first pregnancy was very hard for her as she was extremely fatigued and had a very difficult delivery. Kim was diagnosed with hypothyroidism after the birth of her first child and placed on thyroid hormone (*Armour*<sup>®</sup> thyroid). “I did feel better with the *Armour*<sup>®</sup> thyroid, but I was still cold. The worst thing was that my energy never really returned after the birth of my son,” she said. Kim heard a lecture that I gave on iodine and had her iodine levels checked. Her iodine-loading test was low at 22% excretion (normal >90%) and she was placed on 50mg/day of *Iodoral*<sup>®</sup>. “I felt a huge change immediately. My energy returned and all of my remaining hypothyroid symptoms resolved within weeks. It felt like a miracle,” she said. Kim became pregnant shortly after starting the iodine supplementation and she delivered a healthy baby boy nine months later. During the pregnancy, she continued the iodine supplement. “At 42 years old, this

*was the easiest pregnancy. I gained 16 pounds and could fit into all my regular clothes right after I delivered. My midwife was amazed at how easy this pregnancy was on me. I wasn't even fatigued after the delivery. I wish that I had taken iodine earlier in my life," she claimed.*

Kim's story is repeated over and over in my practice. Iodine supplementation often helps improve a hypothyroid condition. Many times, even with the supplementation of thyroid hormone, some hypothyroid symptoms still remain. My experience has shown that the best results in treating a thyroid condition will occur when iodine deficiency is rectified.

<sup>1</sup> Vitale, M. Endocrinology. 2000 Feb; 141(2):598-605.

## Chapter 15

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### Questions and Answers

## CHAPTER 15: QUESTIONS AND ANSWERS

This chapter will help to answer common questions regarding iodine.

**Q: Is there a difference between Lugol's iodine and tableted Lugol's such as Iodoral® or Iodozyme HP™?**

A: No. All three items contain iodine and iodide. Two drops of Lugol's equals one Iodoral® or Iodozyme HP™ tablet (with both supplying 12.5mg of iodine/iodide). Lugol's solution has a fairly strong metallic taste that many find offensive. For doses under 50mg, I generally prefer tableted iodine. For doses greater than 50mg, I suggest taking Lugol's iodine since the price is less expensive.

**Q: Do children need iodine?**

A: Yes. Children and adults need adequate amounts of iodine. Children need smaller amounts due to their size. Iodine dosing guidelines for children were covered in [Chapter 10](#).

**Q: Is the iodine patch test reliable?**

A: No. The iodine patch test does not provide useful information on the body's total iodine status. Approximately 20% of the body's iodine load is found in the skin. The iodine patch test may provide information about how much iodine is in the skin, but the studies have not been done to verify that. One study found that over 85% of the iodine applied to the skin sublimated (evaporated) into the air. A more reliable indicator of the total body iodine load is the 24-hour urinary iodine-loading test.

**Q: If I have no thyroid gland, do I need iodine?**

A: Yes. Iodine is found in all the tissues of the body, not just the thyroid gland. Even without a thyroid gland, the rest of the body needs iodine.

**Q: Does iodine supplementation cause goiter?**

A: No. Iodine deficiency causes goiter. Medical research has shown this for over 100 years.

**Q: Does everyone need to take 50mg/day of iodine?**

A: No. There is no single dose that is effective for everyone. I suggest working with a health care provider who is iodine knowledgeable.

**Q: Is iodine deficiency more prevalent now than it was in the past?**

A: Yes. Due to the increased toxicity of our modern surroundings, iodine deficiency is more pronounced now. The onslaught of chemicals and goitrogens such as bromine and fluoride has risen dramatically over the last 40 years. What has happened to our iodine levels during that time period? They have fallen by over 50%. Goitrogens can bind to iodine receptors and also bind to and damage the transport mechanisms for iodine. Goitrogens can exacerbate the iodine-deficiency problem that already is present. Combined with a declining nutrient level in our food supply, it is no wonder that people need to ingest larger amounts of iodine compared to past times.

**Q: Does iodine cause autoimmune thyroid illness such as Hashimoto's and Graves' disease?**

A: No. Autoimmune thyroid illnesses have been increasing over the last 40 years, while iodine levels have been falling. If iodine was the cause of autoimmune thyroid illness, as iodine levels fall, you would expect to see a decline in the incidence of Hashimoto's and Graves' disease. That has not happened. In fact, the opposite has happened—over the last 40 years, autoimmune thyroid illnesses have increased at epidemic rates.

**Q: Are there side effects with iodine supplementation?**

A: There are potential side effects from supplementing with anything, iodine included. With proper follow-up visits and monitoring, adverse effects are easily treated. [Chapters 5-7](#) review how to minimize adverse effects with autoimmune thyroid disorders and [Chapter 13](#) describes the adverse effects of iodine in more detail.

**Q: Why hasn't conventional medicine recognized that iodine deficiency is still present today?**

A: A natural product cannot be patented. A patentable product can be very profitable for a pharmaceutical company. Big Pharma cartel's main interest is to make a profit. Big Pharma has shown little interest in any natural product because they cannot maximize their profits on non-patentable products. Furthermore, most of the money for drug research is controlled by pharmaceutical companies. Big Pharma has no financial interest in looking at any inexpensive natural product, including iodine.

**Q: Does iodine deficiency cause breast cancer?**

A: Breast cancer is a multi-factorial illness. However, the evidence linking iodine deficiency to breast cancer is overwhelming. Iodine deficiency may or may not be the sole cause of the epidemic of breast cancer that is plaguing us today, but it certainly plays a very large role in this illness. I do not think you can adequately treat a chronic illness like breast cancer without looking for the underlying cause. Breast cancer is not caused by a deficiency of chemotherapy,

*radiation, and surgery. I have no doubt that iodine deficiency, coupled with the increased toxic load of our environment, is a major part of the reason why we have an epidemic of breast cancer.*

**Q: Don't I get enough iodine from salt?**

*A: No. The iodine in salt is not very bioavailable for our bodies. In addition, many people are avoiding salt entirely in their diets. Refined salt is a toxic substance for our bodies and needs to be avoided. Unrefined salt is a much healthier substance for us. For more information, I refer the reader to my book, Salt Your Way to Health.*

**Q: Can I get too much iodine?**

*A: Yes. You can get too much of anything. It is essential to have proper follow-up with your health care provider. As previously stated, adverse effects from ingesting excess iodine can be easily treated with an adjustment of the dose. Keep in mind that if you have normal kidney function, excess iodine ingestion should be easily excreted by the kidneys.*

**Q: Do I have to lower the dose of my thyroid medication when I start taking iodine?**

*A: It varies for everybody, but my experience has shown that one-third of the people being treated with thyroid hormone can lower or significantly reduce their level of thyroid hormone when starting iodine. The other two-thirds of the people taking thyroid hormone can remain on the same dosage. If there are any palpitations when starting iodine, consult with your physician about decreasing the thyroid dose. Also, some patients who are already taking thyroid hormone find when they start supplementing with iodine, they will no longer need thyroid hormone. Proper monitoring by an iodine-knowledgeable health care practitioner can help guide you.*

**Q: Does iodine supplementation cause palpitations?**

*A: In some people it does. Iodine supplementation works best as part of a holistic treatment regimen emphasizing vitamins, minerals, and hormone balancing. A few patients are very sensitive to everything they take. Sometimes I have my patients take iodine every other day. Each person needs an individualized dose.*

**Q: Is iodine an antioxidant?**

*A: The research is clear; iodine, like vitamin C, can function as both an antioxidant and an oxidant. In fact, iodine is one of the most potent antioxidant substances known. We need a balance in our bodies between both antioxidants and oxidants. Iodine, like vitamin C, can help to provide this balance.*

**Q: Can iodine supplementation cause a flare of Hashimoto's or Graves' disease?**

*A: Yes. However, if iodine is given as part of a comprehensive holistic treatment program, my clinical experience has shown this to be a very rare occurrence. It is important to provide the proper nutrients to slow down the oxidative damage that occurs in autoimmune thyroid illness (covered in [Chapters 5-7](#)). Unrefined salt, vitamin C, selenium, and magnesium supplementation all help to minimize a flare. These nutrients can be taken for 2-4 weeks before beginning iodine therapy to minimize the risk of precipitating a flare.*

## Chapter 16

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### *Final Thoughts: Overcoming Medical Iodophobia*

## CHAPTER 16: FINAL THOUGHTS. OVERCOMING MEDICAL IODOPHOBIA

"Medical iodophobia is the unwarranted fear of using and recommending inorganic, non-radioactive iodine/iodide within the range known from the collective experience of three generations of clinicians to be the safest and most effective amounts for treating the symptoms and signs of iodine/iodide deficiency—from 12.5-50mg/day." Medical iodophobia was the term coined by my mentor on iodine, Dr. Guy Abraham.

Dr. Abraham meticulously went through the history of iodine in medicine and wrote a series of articles about iodine in The Original Internist. These articles can be accessed at: [www.optimox.com](http://www.optimox.com).

It is unbelievable to me that in our modern times, most doctors do not understand and are unwilling to learn about the importance of maintaining optimal iodine levels. Every cell in the body needs and requires iodine to function optimally. The white blood cells cannot fight infection without iodine. Iodine is concentrated by the glandular tissue in order to maintain a normal glandular architecture. Furthermore, each gland requires adequate iodine levels in order to produce hormones. There is not a single hormone in the body that can be produced without sufficient iodine.

As I have described in this book, iodine deficiency leads to severe consequences which include an increased cancer risk in the breast, ovary, uterus, thyroid, and prostate. Furthermore, low iodine levels lead to a host of serious illnesses such as autoimmune thyroid illness, hypothyroidism, a poorly functioning immune system, fatigue, ADHD, autism, and heart disease. Looking at the therapeutic effects of iodine makes it hard to comprehend that medical iodophobia still exists, but, unfortunately, it is alive and present today.

### WHY DOES MEDICAL IODOPHOBIA STILL EXIST TODAY?

For over 13 years, nearly every new patient that has come to my office (including my partners' patients) has had his/her iodine levels assessed. The numbers don't lie: After testing over 6,000 patients, iodine deficiency is occurring over 96% of the time. During this same time period, when iodine levels are determined to be low, I have been recommending iodine supplementation. I can unequivocally state that iodine therapy provides more positive results than any other item—including drugs and supplements.

Seeing the positive results on a daily basis makes me ask myself, "How can so many doctors still be afraid of using iodine?" I will try to answer that question throughout this chapter.

### DOES IODINE CAUSE HYPOTHYROIDISM?

When I am lecturing, this is one of the most common questions I am asked by physicians. Although I described iodine-induced hypothyroidism in Chapter 13, I would like to add to the discussion here. After treating thousands of patients—between myself and my partners—we have seen a grand total of two patients who developed iodine-induced hypothyroidism. That is less than 0.1% of the patients we have treated. Although it can occur, it is not very common. Reading and receiving many holistic and conventional doctor rants about iodine would have you believe that iodine-induced hypothyroidism is a common side effect of using iodine therapy. It is not.

The reason many doctors think iodine-induced hypothyroidism is a common side effect of iodine therapy is that they do not understand the biochemistry and physiology of iodine. For some patients, at the start of iodine therapy, the thyroid stimulating hormone (TSH) level increases. I would estimate that the TSH rises in approximately 25% of patients who begin iodine supplementation. In fact, the TSH level can rise above the laboratory reference range. How high can it go? For most patients, it can rise to 5-15mIU/L (normal 0.5-4.5mIU/L) for up to six months.

Does a rising TSH indicate hypothyroidism? Not necessarily. In the vast majority of cases—at least 95%—a rising TSH due to iodine supplementation does not represent iodine-induced hypothyroidism. I have been lecturing to doctors about this concept for over ten years. Doing a history and physical exam as well as following all of the thyroid tests can distinguish a normal and expected iodine-supplemented TSH increase from a TSH increase that indicates hypothyroidism.

A hypothyroid TSH increase is associated with lowered thyroid hormone levels—T3, T4, and reverse T3. Furthermore, a hypothyroid TSH increase is also accompanied with clinical signs of hypothyroidism such as fatigue, headaches, coldness, dry skin, weight gain, etc.

A normal and expected TSH increase with iodine therapy is not accompanied with lowered thyroid hormone levels. In fact, T3, T4, and reverse T3 often improve with iodine therapy. Most importantly, the patient will not complain of feeling poorly with iodine therapy—they generally report feeling better. I can guarantee you that, if a patient reports to feeling better with iodine supplementation, it is not causing hypothyroidism.

Keep in mind that, when starting iodine therapy, an elevated TSH is an expected and normal response of the pituitary gland. As I discussed previously, TSH stimulates sodium-iodide symporter (NIS) formation. NIS is needed to transport iodine from the blood stream into the cells. If there is little iodine, there is little need for NIS. Once iodine is supplemented, the body needs to make more NIS. It requires elevated TSH to do this. It usually takes three to six months to saturate the cells with iodine. At that point TSH levels will decline back to the reference range. Simply following thyroid hormone levels and doing a history and physical exam can quickly put to rest the idea that iodine is causing hypothyroidism.

### FINAL THOUGHTS

Unfortunately, medical iodophobia is still alive and well. However, it is the result of misinformation and ignorance. Understanding the biochemistry and physiology behind iodine should cure anyone of medical iodophobia. After treating thousands of patients and lecturing to many health care professionals and hearing their stories of success with using iodine, I am sure that medical iodophobia can be overcome.

## APPENDIX: RESOURCES

1. Iodoral® can be purchased from:

Individual orders for Iodoral can be purchased at Center for Holistic Medicine (Dr. Brownstein's office):

1.866.877.6467 or [www.centerforholisticmedicine.com](http://www.centerforholisticmedicine.com)

2. For iodine testing and the iodine-loading test as well as bromide and fluoride testing contact:

**FFP Lab** ([www.ffplab.org](http://www.ffplab.org))

1.877.900.5556

**Hakala Labs** ([www.hakalalabs.com](http://www.hakalalabs.com))

303.763.6242

**Doctors Data** ([www.doctorsdata.com](http://www.doctorsdata.com))

800.323.2784

3. For allergies to iodine, NAET (Nambudripad's Allergy Elimination Technique) can be helpful. To find an NAET practitioner please call: 1.714.523.3068 or look on the internet: [www.naet.com](http://www.naet.com).

4. A compounding pharmacist can make up Lugol's solution or bioidentical hormones. To find a compounding pharmacist, please contact:

The International Academy of Compounding

Pharmacists (IACP)

[iacpinfo@iacprx.org](mailto:iacpinfo@iacprx.org)

(800)-927-4227

Fax: 281-495-0602

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## **Books by David Brownstein, M.D.**

More information: [www.drbrownstein.com](http://www.drbrownstein.com)

### **Vitamin B12 for Health**

**Vitamin B12 deficiency is occurring in epidemic numbers. This book show you the many benefits of using natural, bioidentical forms of vitamin B12 and how B12 supplements can help you achieve your optimal health. B12 therapy can treat many common ailments including:**

- Anemia
- Autoimmune Illness
- Blood Clots
- Brain Fog
- Cognitive Decline
- Depression
- Fatigue
- Fibromyalgia
- Heart Disease
- Muscle Disease
- Neurologic Problems
- Osteoporosis
- AND MUCH MORE!

### **IODINE: WHY YOU NEED IT, WHY YOU CAN'T LIVE WITHOUT IT, 5<sup>th</sup> EDITION**

**Iodine is the most misunderstood nutrient. Dr. Brownstein shows you the benefit of supplementing with iodine. Iodine deficiency is rampant. It is a world-wide problem and is at near epidemic levels in the United States. Most people wrongly assume that you get enough iodine from iodized salt. Dr. Brownstein convincingly shows you why it is vitally important to get your iodine levels measured. He shows you how iodine deficiency is related to:**

- Breast cancer
- Hypothyroidism and Graves' disease
- Autoimmune illnesses
- Chronic Fatigue and Fibromyalgia
- Cancer of the prostate, ovaries, and much more!

### **OVERCOMING ARTHRITIS**

**Dr. Brownstein shows you how a holistic approach can help you overcome arthritis, fibromyalgia, chronic fatigue syndrome, and other conditions. This approach encompasses the use of:**

- Allergy elimination
- Detoxification
- Diet
- Natural, bioidentical hormones
- Vitamins and minerals
- Water

### **DRUGS THAT DON'T WORK and NATURAL THERAPIES THAT DO, 2<sup>nd</sup> Edition**

**Dr. Brownstein's newest book will show you why the most commonly prescribed drugs may not be your best choice. Dr. Brownstein shows why drugs have so many adverse effects. The following conditions are covered in this book: high cholesterol levels, depression, GERD and reflux esophagitis, osteoporosis, inflammation, and hormone imbalances. He also gives examples of natural substances that can help the body heal.**

**See why the following drugs need to be avoided:**

- Cholesterol-lowering drugs (statins such as Lipitor, Zocor, Mevacor, and Crestor and Zetia)
- Antidepressant drugs (SSRI's such as Prozac, Zoloft, Celexa, Paxil)
- Antacid drugs (H-2 blockers and PPI's such as Nexium, Prilosec, and Zantac)

- Osteoporosis drugs (Bisphosphonates such as Fosomax and Actonel, Zometa, and Boniva)
- Diabetes drugs (Metformin, Avandia, Glucotrol, etc.)
- Anti-inflammatory drugs (Celebrex, Vioxx, Motrin, Naprosyn, etc)
- Synthetic Hormones (Provera and Estrogen)

### SALT YOUR WAY TO HEALTH, 2<sup>nd</sup> Edition

Dr. Brownstein dispels many of the myths of salt—salt is bad for you, salt causes hypertension. These are just a few of the myths Dr. Brownstein tackles in this book. He shows you how the right kind of salt—unrefined salt—can have a remarkable health benefit to the body. Refined salt is a toxic, devitalized substance for the body. Unrefined salt is a necessary ingredient for achieving your optimal health. See how adding unrefined salt to your diet can help you:

- Maintain a normal blood pressure
- Balance your hormones
- Optimize your immune system
- Lower your risk for heart disease
- Overcome chronic illness

### THE MIRACLE OF NATURAL HORMONES, 3<sup>rd</sup> EDITION

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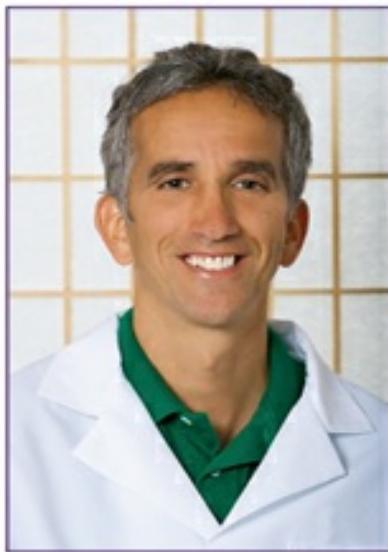
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**David Brownstein, M.D.**  
is a Board-Certified family practitioner who utilizes the best of conventional as well as holistic medicine.

Dr. Brownstein has authored eleven books including:

- Drugs That Don't Work and Natural Therapies That Do
- Overcoming Arthritis
- Overcoming Thyroid Disorders
- Salt Your Way to Health
- The Guide to a Dairy-Free Diet
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Dr. Brownstein is the Medical Director of the  
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